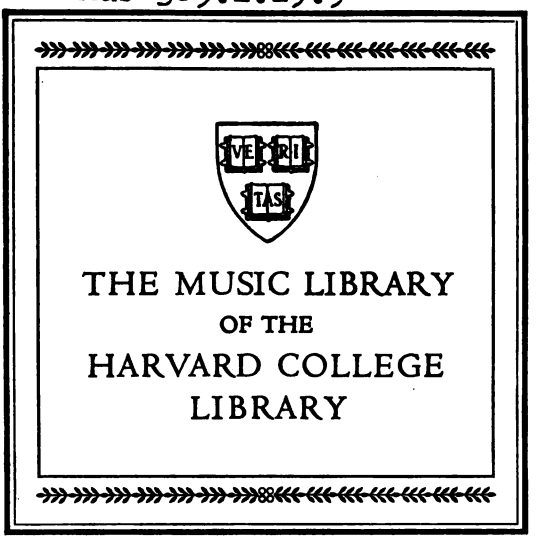

Francis H. Curtis

HISTORY

OF

THE BOEHM FLUTE;

WITH

from the Author - Jan.y 1883.

ILLUSTRATIONS EXEMPLIFYING ITS ORIGIN BY PROGRESSIVE STAGES,

AND

AN APPENDIX CONTAINING THE ATTACK ORIGINALLY MADE ON BOEHM, AND OTHER PAPERS RELATING TO THE BOEHM-GORDON CONTROVERSY.

BY

CHRISTOPHER WELCH, M.A. Oxon.

Tibia non, ut nunc, orichalco vincta, tubæque
Æmula, sed tenuis simplexque, foramine pauco,
Aspirare et adesse choris erat utilis, atque
Nondum spissa nimis complere sedilia flatu.

Hor., *A. P.*, 202–5.

LONDON:
RUDALL, CARTE & CO., 23, BERNERS STREET.
1883.

PREFACE.

An apology is due to the reader for the unsystematic and desultory manner in which the matter which forms this small volume is put together. The only thing I can offer as an excuse is the way in which the little book originated. It was as follows:—

At the close of the year 1881, I wrote, for the *Musical Standard*, an obituary article on Boehm, of whose death I had then just heard. Soon after it appeared, I was asked to write again, and to deal more fully than I had previously with the question, whether Captain Gordon ought, or ought not, to be regarded as the real inventor of the flute attributed to Boehm (an old controversy which had just then been revived, both in England and on the Continent), and, in compliance with this request, I contributed another article to the *Musical Standard* under the title of "The Invention of the Boehm Flute."

I at first intended that the articles should appear either anonymously, or else under the

signature of a *nom de plume*, as had all my previous contributions to the *Musical Standard*, but the Editor thought that they might be more interesting if my name were appended to them, especially as I was one of the last Englishmen, if not the last, who saw Boehm before his death.

I complied with the suggestion he made, and it having thus become known that I was the writer, several brother amateur flute-players, who did not take in the *Musical Standard*, expressed a wish to have what I had written, and I promised to get a few copies of the two articles printed separately, for private distribution. I also determined to take the opportunity of making a revision of the text, rendered necessary by the results of renewed and more careful researches. Moreover, as I had been asked what authority I had for some of my statements, I resolved to add notes, which should consist partly of references and partly of matter, which the limited space assigned to an article in a newspaper had rendered it previously impossible to introduce.

Whilst I was writing the notes, the controversy between the Boehmites and Gordonites was still going on, and it occurred to me that a collection of the chief literary productions which had appeared on the subject would be a not uninteresting

appendix to my two articles, and, finally, considering that what I was about to put together would, with some additions, form a chapter in the history of the flute—a history (however humble the flute may be from a musical point of view) incomparably more varied and interesting than that of any other instrument—I decided to ask Mr. Carte, whom I have to thank for valuable information, to allow the House of Rudall and Co. to be named as it publishers.

CHRISTR. WELCH.

UNITED UNIVERSITY CLUB,
November, 1882.

The Author will be much obliged if any of his readers who possess information respecting instruments with ring-keys constructed before 1831 *will kindly communicate it to him under cover to the Publishers. He would also be glad to hear of the existence of a copy of Gordon's prospectus, or of drawings of his earlier flutes.*

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THEOBALD BOEHM.

An Obituary Article published in the 'Musical Standard.'

Theobald Boehm in his eighty-third year.[1]

THE death is announced of this once celebrated flautist at the patriarchal age of eighty-eight.[2] In

[1] This portrait is taken from a photograph sent by Boehm as a present to my friend, Mr. W. P. Mills, who has kindly permitted me to have it engraved.

[2] It took place on the 25th of November, 1881.

Germany, fifty years ago, Boehm was considered the first flute-player of the time.[3] He was remarkable alike for his great execution, and the grace and good taste of his style. "D'après les éloges, qui lui sont accordés par les artistes, qui sont entendu," says Fétis, "il paraît que Boehm se distingue également et par sa belle manière de chanter *l'adagio* et par le brillant de son exécution dans les difficultés." His works are very numerous, and some of his solos are not unfrequently heard in the concert-room, even at the present day.

But his fame as a performer and composer has been completely eclipsed by his success as an inventor. In connection with this, it is scarcely an exaggeration to say that his name is a household word with every flute-player in the world. So radical were the changes which he introduced, that the flute now in general use may be said to be a new instrument under an old name. When he took it in hand, the flute was not only very much out of tune, but scarcely two of its notes were alike in quality or power, some of them being strong and clear, others weak and muffled.[4]

[3] Fétis, in the first edition of his 'Biographical Dictionary' (1835, article "Boehm"), speaks of Boehm as, "considéré comme le premier flûtiste de l'époque actuelle, en Allemagne." In the second edition of this work (1860), for "le premier flûtiste" is substituted "un des plus habiles flûtistes."

[4] In a pamphlet entitled, 'Examen critique de la Flûte ordinaire comparée à la Flûte de Bôhm,' Coche prints the scales, and indicates separately each note, which, on the old flute, was either

Several of the shakes, too, were wretched,[5] and as an instance of their bad effect, it may be mentioned that Nicholson, although his tone was admitted to be better than that of any other player of his day, never made the shake on D, which occurs in the 'Ranz des Vaches,' in the overture to 'William Tell'; without causing a shudder to run through the band.[6]

By adopting two principles, one that the holes should be equal, or nearly so, in size; and the other that the keys when in repose should be open instead of closed, and by constructing mechanism by which these principles could be carried out, Boehm produced such a revolution in the instrument, that one of the jurors[7] at the exhibition of 1851, remarked that, in comparison with

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sharp, flat, or feeble, and sums up by saying, "What can be expected of an instrument, which, out of 217 notes, forming the total of the twelve scales, presents almost half of them defective (fausses)?"

[5] "In a compass of three octaves, the flute of the present day presents forty notes on which one cannot execute a shake without causing a defective sound to be heard."—*Coche.*

[6] This very imperfect shake attracted the attention of the conductor of the orchestra of the Covent Garden Opera House, Signor, now Sir Michael Costa.

Coche includes it in a list of twenty-five passages, taken from the works of Auber, Boieldieu, Cherubini, Carafa, Ad. Adam, and other distinguished composers, which he brings forward as examples of music which it was impossible to execute in a satisfactory manner on the flute then in use, though written for that instrument.

[7] This was Berlioz. Mr. Carte, who was present on the occasion, informs me that he heard him make this observation in French, as he was walking about the room whilst the instruments were being tested. He was making a comparison by playing upon a flute on the old system.

Boehm's, the eight-keyed flute was only fit to be played at a fair. It must be admitted, however, that Boehm was not so successful with the high notes, from the D upwards, as he was with the two lower octaves. It is true that execution in this region was so much facilitated, that passages, before almost impossible, were rendered comparatively easy; but the tone of most of the notes was thinner and poorer than on the old flute, and their intonation anything but satisfactory, as they became, when forced, much too sharp.

As Boehm's improvements are applicable to the rest of the wood-wind, the oboe, clarionet, and bassoon, surprise has been expressed that they have not been more generally adopted. The explanation usually given is, that it is impossible to improve these instruments; that, with them, improvement would be destruction, as their essential character lies in their imperfections.

Perhaps, however, the cause of this absence of reform may rather be traced to the want of a sufficiently large number of amateurs to break down by their influence the conservatism of professional players, and to overcome their disinclination to change. A musician who has spent his youth in learning to conceal the defects of an instrument, has but little inclination to give up the vantage he has gained, nor has he time, amidst the engagements of his professional career,

to learn a new system of fingering. Still less can he be expected to place in the hands of a young player, soon, perhaps, to become a rival, an instrument which may be the means of enabling him to come to the front in the race for artistic distinction.

A clarionet[8] on the Boehm system, modified by Klosé, is in use in military bands in France, and the Boehm oboe has been adopted in this country by M. Lavigne, who is so celebrated as a solo player. His execution on it is amazing, and it seems to have double the power of the old oboe, enabling him to make extraordinary *crescendos* and *diminuendos*. Unfortunately, however, when playing in the orchestra, he does not always refrain from using the extra power he has at his command, and so causes the oboe to unduly predominate. This creates a prejudice against the instrument, especially as the characteristic reedy tone is intensified, and assumes a piffero-like *timbre* in the loud sounds.[9]

[8] The mechanism of this clarionet was contrived by Buffet. Klosé pays him the following compliment :—"It is to M. Auguste Buffet, junior, who seized and interpreted my ideas with a rare happiness, that I owe the instrument I now present to artists and amateurs."—*Klosé's 'Method for the Clarinet,'* English edition, published by Rivière and Hawkes.

In England a clarionet on Boehm's principles has been designed by Mr. Carte, and is manufactured by Rudall, Carte and Co., but it has not come into general use. I have seen a Boehm bassoon, but have never heard of one being played.

[9] I learn from M. Buffet, who made the instrument on which M. Lavigne plays, that, though it was bored on a model, or bit, as

Having effected a reformation in the holes, Boehm next directed his attention to the shape of the interior of the flute, and in 1846 succeeded in his second great achievement—a new bore,[10] cylindrical in its lower two-thirds, but tapering in its upper part, where it terminates in a truncated cone.[11]

At first the new bore met with violent opposition. So great was the prejudice against it, that the late Mr. Clinton declared that, if the cylinder were right, Nature herself must be wrong. However, it soon gained the ascendancy, and before many years even Mr. Clinton began to manufacture cylindrical flutes.

The following are the chief advantages which the cylindrical has over the conical bore :—Greater ease in blowing, less strength of lip being re-

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it is technically called, he received from Boehm, the holes, by M. Lavigne's instructions, were made larger than those proposed by Boehm. This, of course, would account for the altered tone.

[10] Boehm is said to have made no less than three hundred experiments in connection with this invention. A very interesting account of them is given by him in his pamphlet, 'Ueber den Flötenbau und dessen neueste Verbesserungen,' Mainz, 1847, to which, or to the French translation of it, often quoted in this work, entitled, 'De la Fabrication et des derniers Perfectionnements des Flûtes,' Paris, 1848, the reader is referred. [Since I wrote the above, an English adaptation of this work has been published by Messrs. Rudall, Carte and Co., under the title of 'An Essay on the Construction of Flutes.']

[11] The termination is not, strictly speaking, conical, but slightly curved. Boehm professed to employ the curve of the parabola, so that the bore at this part may be said, I suppose, to correspond to a truncated parabolic conoid.

quired; greater carrying, or penetrating power, the sound being audible further off, and the tone, to listeners at a distance, being clearer and brighter, as proved by an experiment made in the Albert Hall[12]; a better *piano*, the soft tones being more delicate in quality; greater certainty in eliciting, and greater ease in subduing, the high notes, which are less liable to become too sharp.[13] In one respect, however, it is inferior: for, in passing rapidly from the higher to the lower part of the instrument, the performer cannot attack, or articulate, the low notes with so much force and firmness.[14]

It has been the subject of a controversy, to which national jealousy has imparted needless warmth, whether Boehm was, or was not, indebted

[12] For an account of this experiment see Note A, p. 12.

[13] Further remarks on the intonation of the cylinder flute will be found at p. 13, Note B.

[14] It has been stated that the *son plein*, a quality of tone resembling that of the clarionet, which can be produced in the lowest octave of the flute, is peculiar to the cylindrical bore. This reedy *timbre*, however, can be brought out with quite as much, if not more intensity on the conical flute: it depends, not on the bore, but on the size of the holes, and the strength of the lip of the performer. Nicholson, who could elicit every variety of tone which the flute is capable of producing, is said to have forced it out in a way never before heard, and hence it was christened the "Nicholsonian effect." It is much cultivated by English flute-players, and those who have strong lips are often very proud of being able to "thrash" the flute, as they term it, and so make it heard. Most of the continental flautists, however, look upon its use, except to a very limited extent, as an indication of bad style, akin to the questionable taste of some *contralto* singers, who, finding themselves gifted with the faculty of emitting their low notes with great power, never lose an opportunity of forcing them on the ear of the listener.

for some of his ideas to a Captain Gordon, a Swiss gentleman of English extraction, who was working, amongst others, at the same time, with the same object. But however this may be, there can be no doubt whatever but that Gordon adopted some of Boehm's inventions, and even the French admit that two of his keys, those for F sharp and the D shake, belong to Boehm.[15]

Gordon, who began to make experiments in Paris in 1826, made Boehm's acquaintance in London in 1831,[16] when each showed the other the result of his labours up to that time. Boehm observed that Gordon had lowered and enlarged the E hole, as well as that he had adopted a ring-key.[17] But the idea of this contrivance was not new to him, for he states that not only had he had in contemplation a flute with mechanism based on a system of ring-keys before 1831, but that he had already made, since he had been in London, a model of the new instrument.[18] It was not until he heard the magnificent tone of Nicholson, and saw the enormous[19] holes of his flute, that he began to despair of being able to retain the old fingering.

They parted; Boehm returned home, and in

[15] p. 80. [16] pp. 20, 83. [17] p. 21. [18] p. 84.

[19] The holes of the flutes made for Nicholson's own use were much larger than those of the instruments sold as "Nicholson flutes." Boehm, whose fingers, though long, were thin and taper, told me that when he attempted to play on Nicholson's flute he found himself unable to stop the holes. He described Nicholson as a handsome man of commanding stature and muscular build, with a powerful and capacious chest.

1832 invented the flute which bears his name. In 1833 Gordon went to Munich, and from that time the rival inventors appear to have always been on friendly terms.[20] Boehm placed an artisan and a workshop in his own house, at the disposal of Gordon, who, after working some months and incorporating in his new production, with the inventor's consent, some of Boehm's fingering, issued an announcement of his flute.[21] In 1838 a Frenchman commenced the manufacture of the Boehm flute, which had previously been imported into France from Germany, and, at the same time, the invention was claimed in Paris as Gordon's. A letter was then written to Gordon in Switzerland for information on the subject, but, owing to the state of his health, his wife thought it best to conceal it from him, and to reply to it herself. Her answer,[22] which does credit rather to her heart than her head, does not throw any new light on the point at issue.

An examination of the engraving,[23] representing the ingenious, but practically useless instrument, on which the claim is based, shows that it was larger and much less conical[24] than usual in shape,

[20] It is only fair to mention that, since this article was published in the *Musical Standard*, I have been told by Buffet, who knew both Boehm and Gordon, that they had a violent (*brulante*) quarrel; but when or where it took place, he was unable to inform me.

[21] p. 86. [22] p. 81. [23] Fig. 7, p. 74.

[24] This departure from the usual conical shape is so marked, that, judging from the engraving, one would suppose that Gordon's flute, if not actually cylindrical, presented a distinct approach to the

and that the B flat and F sharp (the latter, as we have seen, taken from Boehm), were produced by the fingers of the right hand, as on Boehm's instrument, though the mechanism by which the action of the fingers is conveyed to the holes to be closed is very different. It may be mentioned, *en passant*, that this cross-action of the fingers is a drawback to Boehm's system, and that in the attempts (some of them successful) which have been made by Carte, Briccialdi, and others to make improvements on it, one of the chief objects has been to do away with these objectionable back-fingerings.[25]

But whether Boehm borrowed from Gordon, or whether the same ideas occurred to both inventors independently of each other, or whether these ideas were derived from some common source, it is certain that to Boehm is due the credit of bringing them into a practical form, and introducing them to the world. No sooner had his announcement been issued, than Gordon undertook a journey to London, in the hope of getting his flute taken up, but he was doomed to disappointment. He returned to his family in Switzerland much depressed, though he again recovered his spirits. How-

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cylindrical form. I am assured, however, by M. Buffet, who knew Gordon and did work on his flute, that this resemblance is superficial only. Gordon's bore was probably funnel-shaped at its lower end, like that of the bass flute represented in Fig. 1.

[25] See Note C, p. 16.

ever, two or three years afterwards, in endeavouring to effect, with his own hands, a further improvement in his flute, he had the misfortune to crack it; whereupon his reason, which had been tottering since 1830, gave way, and it was found necessary to place him under restraint.

In early life Boehm learnt his father's business, that of a silversmith, and the skill he thus acquired in the use of tools was of great assistance to him in his experiments. He employed his inventive power on several other things besides the flute,[26] and, for one of his inventions, an improvement in the manufacture of iron, he received a prize medal. He visited England nine times, and spent altogether more than two years in this country. He used to speak with enthusiasm of his reception, and of the kindness and hospitality of his English friends. When the writer had the pleasure of seeing him at Munich in September 1881, notwithstanding his great age, he still held himself erect and walked with a firm step. Of this evidence of a hale frame, so seldom seen in his unwonted years, he was very proud, and he attributed it, as well as his good health and longevity, to his temperate habits; for, without being particularly abstemious, he always avoided excess, especially in alcohol. Although he did not marry until he was twenty-six, he left behind him more than fifty descendants.

[26] In the first edition of Fétis's Dictionary, he is credited with the invention of a new kind of pianoforte.

NOTE A, p. 7.

Mr. Radcliff having an engagement for a concert to be given at the Albert Hall, during which he was to play a solo, a duet with the pianoforte, and an *obbligato* to a song, besides taking part in other music, it was arranged to take advantage of the opportunity to make a comparison between the effect, in this large building, of the conical and the cylindrical flute. Mr. Radcliff was to use sometimes a conical and sometimes a cylindrical instrument, and to prevent those who were to be the judges from being swayed by prejudice, he was not to let it be known beforehand on which of the two he was going to play.

I stationed myself in the gallery, as far as possible from the orchestra, and from where I was placed I soon detected a marked difference between the two flutes. On the one the notes were bright, the rapid passages clear and sparkling, and the tone possessed of that limpid sweetness so characteristic of the flute; whilst the effect of the other seemed, in comparison, to be dull, heavy, and indistinct. Mr. Carte was present in another part of the Hall, and his impression corresponded very much with my own.

At that time I was playing on a conical flute, having left the cylinder for it, being firmly convinced that, whatever difference of opinion there might be as to its effect close at hand, there could be no doubt of its superiority when heard at a distance. Whenever, therefore, the better effect was produced, I felt no doubt whatever, but that Mr. Radcliff was using the conical flute, and great was my surprise on learning from him, after the concert, that I was wrong in every instance.

This experiment seemed to me to be so conclusive that I at once returned to the cylinder, and I have played on it ever since. I believe that Mr. Radcliff now seldom uses a conical flute for his public performances.

I ought to mention that in this trial the cone had more than a fair chance. The conical flute was Mr. Radcliff's own, which he had in daily use; whereas the cylinder was one lent him for the occasion, and it was only placed in his hands a few hours before the concert. Moreover it was on the Boehm system of fingering, a system very different from Mr. Radcliff's, and although this talented *artiste* is gifted with the extraordinary power of being able to play on any flute, no matter what the fingering may be, yet he must have been at a disadvantage when using an instrument to which he was not accustomed.

Both flutes were of wood, with lined heads.

NOTE B, p. 7.

Notwithstanding this improvement, the chief difficulties with which the player has to contend as regards intonation still lie in the high octave; and nothing but a correct ear and a good embouchure will enable him to overcome them.

Each note of the second octave is slightly flatter than the corresponding note of the first, but this difference is so trifling as to be of little practical moment. It is different, however, with the high octave, where many of the notes, unless skilfully blown, become, especially in *forte* passages, unmistakably and painfully sharp. When the air within the flute grows warm, the pitch of the instrument rises, and if the high octave is not more affected than the other two, it at any rate becomes more difficult to control. This, as the temperature of a concert-

room is sometimes very high during a performance, adds greatly to the embarrassment of the player. Boehm, who took the utmost pains to endeavour to remedy the defective intonation of the flute, published a *schema* or *diagram*, as he terms it, to enable musical instrument makers to ascertain the theoretically correct places for the different holes; but valuable as this is as a guide or basis, on account of certain of the notes in the high octave, departures are made from it with advantage.

Some improvement may, perhaps, be expected from further experiments with the head-joint, the resources of which are probably not yet exhausted; but there seems to be little or no prospect of perfection of intonation ever being attained. To cause the diameter of the bore to vary, as the performer passes from one octave to another, is, of course, an impossibility; nor is it likely that mechanism of any practical use will ever be contrived for keeping the cork in motion whilst the instrument [27] is being played, or for opening and closing a set of separate and independent holes, as vent-holes for the high notes.

Many, I amongst them, when commencing the study of the flute, have been misled by the statements of flute-makers regarding the perfection of their respective instruments. Mr. Siccama, for instance, in his 'Theory of the New Patent Diatonic Flute' (London, 1850), thus writes: "Although the flute has always been a popular

[27] "Un second inconvénient qui m'obligeait de m'écarter de la théorie, c'est l'impossibilité de faire sur une flûte la distance du bouchon du milieu de l'embouchure en proportion des différentes longueurs des ondulations d'air, parce que, sans un mécanisme extrêmement compliqué et presque impraticable, ni le bouchon ni l'embouchure ne peuvent être faits si mobiles qu'à chaque intervalle cette distance augmente ou diminue selon la longueur inférieure de la colonne d'air. Il faut donc trouver pour le bouchon une place moyenne, de telle sort que les nœuds de vibration des notes les plus élevées ne s'approchent pas trop de l'embouchure et que ces sons puissent encore développer."—*Boehm*.

instrument, scientific musicians have ever regarded it as an imperfect one, on account of its being, in almost every key, out of tune. Many have tried at various times to remedy this defect, and much was hoped for in France from the introduction of the Boehm flute, which, as far as *equality* of tone is concerned, is an improvement on the old plan; but, when examined with respect to correctness of tune, it is very defective, particularly in the higher notes, without taking into consideration the difficulties arising from the complexity of its mechanism. All other attempts in a like manner have only partially succeeded, until it has become the general opinion that this defect of the flute could only be modified, and that it is incapable of being played as perfectly in tune as the violin.

"This imperfection has hitherto formed the great obstacle in studying the flute, for only consummate skill, united with great perseverance and a scientific ear, could enable the performer to arrive at any degree of excellence in the art of flute-playing.

"This subject has occupied the attention of the inventor for some years; and after a very careful investigation of the theory of sounds, and repeated experiments, he has succeeded in producing a flute equal in correctness of tune to the violin. In order to prove this assertion, it will be necessary to enter briefly into the subject of Tune." Here follows a mathematical disquisition on the subject of tuning extending over three pages quarto.

The following remarks, in a very different strain, are from the pen of the late Mr. Clinton:—

"To say that I offer to the public a perfect flute in my recent invention, would be saying more than the flute is capable of being made. No flute is perfect, nor can be; the principle by which we obtain the sounds of thirty-seven pipes, varying in length and size, from one single tube, precludes the possibility of perfection. Nor do I say that my flute is arranged in consonance with

strict acoustical principles, because I am confident so imperfect an instrument as the flute never can be. It is easy to show how the vibrations and the waves of air in the flute are governed by the laws and principles of acoustics, and to the uninitiated ear it smacks in some degree of learning, but it is quite absurd to say that an instrument which, with one tube, has to produce thirty-seven different sounds, and one hole of which (the C sharp hole) I have proved to be connected with the production of so many different notes, can be constructed on true acoustical principles. The flute, by such attempts at refinement, has been lowered to an extent unworthy of it, while no beneficial end has been gained. Mr. Boehm, who for years devoted himself to the study of acoustical laws as connected with the flute, despaired of being able to regulate the instrument by these laws; the result of his experiments he says, in a letter to me, dated January, 1847, is this—that though he sees clearly by the laws of nature why one note or another will not come out freely or in tune, why the octaves are here too flat, here too sharp, &c., he also sees clearly what Savart twelve years before had told him at Paris—*that it is impossible to make a perfect flute.*"—'Treatise on the Flute,' p. 46.

NOTE C, p. 10.

The numberless attempts which have been made to improve the Boehm fingering, form a practical protest against it. But notwithstanding all the ingenuity which has been brought to bear on the subject, no progress has yet been made towards what is so much to be desired, namely, a mechanism with a fingering which should be universally accepted, just as is that of the violin or the pianoforte. Much facility, however, has been gained by a return to the closed keys of the old flute, care being

taken to guard against inequality of tone by the introduction of duplicate holes covered with open keys. In this way, Mr. Carte, by means of a closed F key, has overcome most of the difficulties of the back-fingering for F sharp, and M. Buffet, by having recourse to a closed B flat key, those of the back-fingering for B flat. The majority of the French players, and Mr. Radcliff and his followers in this country, have returned to the closed G sharp, to the great relief of the little finger of the left hand.

Following out this principle still further, I have designed a flute, which has been made for me by Messrs. Rudall, Carte and Co., on which all these three closed keys are retained, whilst the system of open holes is in no instance departed from. On this flute there are very great facilities of fingering, and two new and important shakes in the high octave; at the same time the fingering of the old flute is retained for all the notes except one (C natural). Moreover, by the introduction of a piece of new mechanism, each of the upper notes from D to G, both inclusive, is made with only one, and that in every case the correct, vent-hole (the fifth below the fundamental note); a result, so far as I know, never before obtained.

INVENTION OF THE BOEHM FLUTE.

BOEHM early evinced a disposition to apply his inventive faculty and mechanical skill to the flute. The manual dexterity he had acquired in his father's workshop enabled him, when quite a boy, to construct without any difficulty a four-keyed flute for his own use. As he grew older, it was his constant endeavour to make improvements in the manufacture of his favourite instrument, and amongst his first inventions may be mentioned new springs, cork joints, leather fittings, and a sliding embouchure of gold.[1]

Finding that he could not get his ideas carried out according to his wishes by the musical instrument makers whom he employed, in 1828 he established a flute factory of his own. He now succeeded for the first time in making a flute with which he was satisfied, and on this he played during the professional visit which he paid in 1831 to Paris and London.[2]

[1] 'De la Fabrication des Flûtes,' p. 8.

[2] He played in London at one of the Philharmonic Society's concerts, given on the 9th of May. He chose for the occasion his 'Grande Polonaise' (Op. 16), dedicated to Camus. His performance is thus noticed in the 'Harmonicon': "Mr. Boehm is a very superior

Up to this time his efforts had been directed to the improvement of the eight-keyed flute, but whilst he was in London he reluctantly decided to abandon the old fingering.

What induced him thus to change his views? He shall tell us himself:—

"In this latter city," he says, "I was struck with the volume of the tone of Nicholson, who was then in the full vigour of his talent. This power was the result of the extraordinary size of the holes of his flute,[3] but it required his marvellous skill and his excellent embouchure to mask the want of accuracy of intonation and equality of tone resulting from the position of the holes,

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player, with an excellent tone, and his composition was, comparatively speaking, highly respectable; his style differs from that of Nicholson and Drouet, inasmuch as he strives to touch the heart rather than to astonish."

On May 3rd, he took part in Moscheles' concert, and is said to have played a fantasia "with great ability." He also played at Moralt's concert (Moralt came from Munich) on May 14th, and at Hummel's on the 20th of June.

[3] "The father of the late justly celebrated Nicholson gave greater power to some of the lower tones of the flute by increasing the size of some of the apertures to a most unreasonable extent. We shall shortly see that this process necessarily sharpens the tones of the lower octave more than those of the upper octaves, thereby throwing a still greater inequality into the scales of the instrument and creating the necessity for a greater action and practice of the embouchure.

"It was here that Nicholson greatly excelled; but the instrument was rendered less manageable for all those who did not possess great command of the embouchure, because the means of correcting the defective intonation of the flute are not supplied by the instrument, but are expected from the performer, by a certain alteration of the action and position of the lips and of the force and direction of the jet of breath."—*Ward.*

which was incorrect and repugnant to the elementary principles of acoustics.[4] I saw also in London, at this time, an amateur, Mr. Gordon, who had

[4] "In every flute made in the usual manner, the low C sharp and E flat apertures are much too low; the E natural very much too high; the F natural is also too high, and the F sharp too low; the G nearly right; the G sharp, A natural, and B flat much too high, and the topmost aperture much too low.

"The necessary evil consequences produced by this improper position of the apertures, are attempted to be remedied, so far as intonation is concerned, by making those apertures which are too high, small in size; and *vice versâ*, the apertures too low in position are made large in diameter. But, as may always be predicted in the application of false remedies, the above-named process only very partially relieves one evil whilst it creates another of equal or greater magnitude. As every flute-player is aware, a note determined by a small aperture, even if too high, necessarily yields a paltry, feeble tone; and a too low and large aperture gives a comparatively strong tone. Add to which, there are no apertures provided for the independent production of the second C natural and C sharp, they being made by employing the apertures belonging to other notes, by what is termed cross-fingering. This again being equally a jumbling and confounding of natural laws, gives birth, like the small holes, to a muffled quality and doubtful character of tone. But we appeal to all performers on the best flutes of the usual make, can they produce A, E, C, or other notes, loud, of good quality, and in tune, without so much setting about it and manœuvring, as is utterly impracticable in actual play? We are sure they will answer in the negative; and we are further sure, that even Nicholson, with his special flute, for his special embouchure, did not and could not accomplish what we have asked. On the contrary, he has left on record the existence of these and similar incorrigible difficulties as necessarily appertaining to the instrument. By stupendous practice of the embouchure, he, and other talented performers, have undoubtedly produced wonderful and delightful effects upon the flute; but the honest have, at all times, deposed to the difficulty of arriving at anything like a performance satisfactory to the musician.

"By that quality of the flute which we have above described, the artful quack has had the means of imposing on the public instruments which he could make appear in tune, obtaining thereby an exorbitant and iniquitous profit; on the other hand, many have imposed on themselves by supposing that the flutes on which they

already made numerous attempts at improvement, first at Paris, afterwards in London.

"The E hole on his flute was bored lower down and larger than usual, and, to avoid the lever of the F, he had adopted a ring-key; he had also had made a number of keys and levers ingeniously conceived, but too complicated to ever be of much advantage to his flute, which, moreover, was constructed in defiance of the principles of acoustics, and was, therefore, destined to remain imperfect.

"All this confirmed my conviction, the result of my long researches, that no improvement, really complete, could be brought about without a reform of the system of fingering. I determined, then, to devote my energies to the construction of an entirely new flute, which should combine accuracy of intonation with power and equality of tone, and on which all music written within its compass could be executed.

"On my return to Munich, I set to work. After a careful examination and numerous trials of holes and different kinds of mechanism, I decided on the system of ring-keys as best calculated to fulfil all the requirements, a system which I had already had in contemplation before 1831."[5]

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have witnessed such effects, must be well in tune, and have given large prices to possess them. We have even known instances in which 50*l.* have been given for instruments much worse than ordinary in this respect."—*Ward.*

[5] The French from which this passage is translated will be found at p. 94.

As it was during his acquaintance with Gordon in London that Boehm has been accused of appropriating his invention, and as this charge has caused his name to be mentioned with much obloquy, it may be worth while to inquire for a moment, what he might have seen on Gordon's flute which he subsequently reproduced on his own.

For instance, did he see open-standing keys? Yes, undoubtedly. But open keys were not a new invention; they existed already on the foot joint of the eight-keyed flute, and on other instruments besides the flute.[6]

Or, again, did he see the fingering which he subsequently adopted? The negative evidence on this point is perfectly conclusive with respect to all the notes except two (C natural and B flat), respecting which some uncertainty prevails.[7]

[6] This leads to another and still more important question, namely: Did Boehm now see, for the first time, open-standing valves substituted for the closed keys of the eight-keyed flute; in other words, did he borrow from Gordon the idea of the open-keyed system of fingering? In answer to this question, we may say that, although Gordon carried out the system of open keys still more completely than Boehm, for he opened even the E flat key, which Boehm left closed; yet Boehm on his first model (Fig. 4) had already opened one of the keys, that for F natural; he must, therefore, if this model was made before he saw Gordon's flute, of which I entertain little doubt, have been alive to the importance of open keys before he became acquainted with Gordon. (Compare p. 58.)

[7] If by any chance a drawing of the flute invented by Gordon in 1830 should come to light, this uncertainty could be cleared up. As it is, the matter stands thus: there have come down to us representations of two of Gordon's flutes (Figs. 5 and 7); on one of them (Fig. 7), but not on the other, these two notes are fingered as on

Boehm arrived at his system of fingering by constructing three models, and then choosing from amongst them, after actual use, that which seemed to offer the greatest advantages.[8]

Then, as regards the most important part of the invention—the ring-keys,—Boehm mentions that there was a ring-key on Gordon's flute. But he also states that he showed Gordon a model of his own new flute, which he had made since he had been in London;[9] so that he, too, was able, on his side, to produce a ring-key, in an imperfect form it is true, for it wanted the axle, an important part of the contrivance, but still a ring-key, by means of which one finger could close two holes.

Gordon imagined that the unsatisfactory action of his keys arose, not from the inherent mechanical defects of his system, but from the difficulty of getting his mechanism properly constructed.[10]

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the Boehm flute. Now Boehm says (see Appendix, p. 97): "Mr. Gordon made use of essential parts of my instrument in constructing his own, but he always loyally acknowledged it." Gordon did not acknowledge that he borrowed these two fingerings from Boehm, and it therefore seems to be a legitimate inference from Boehm's observation that Gordon did not take them from the Boehm flute.

[8] "J'avais fabriqué plusieurs plans après de mûres réflexions sur toutes les combinaisons de tons possibles et de mouvements de doigts —car dans de telles choses, ce n'est que la pratique que décide définitivement—et je fabriquais trois modèles de flûtes construites différemment, parmi lesquelles par l'examen soigneux de tous les avantages et désavantages, il se montra que le modèle de ma flûte comme depuis lors offrait tous les avantages mieux que les autres." —*Extract from a manuscript given to the Author by Boehm.*

[9] p. 84.

[10] See Appendix, p. 109.

Having failed in this in Paris, he had come to London, where he employed two flute-makers, Messrs. Rudall and Rose[11] and Mr. Ward,[12] but without success. He then determined to try what Boehm, who had a very skilful workman, could do for him, and in 1833 he went to Munich.[13] He must here have seen, for the first time, the Boehm flute, which had been finished in the previous December, and it is only reasonable to suppose that if it had been merely a modification of his own invention, as has been alleged by M. Coche, he would at once have indignantly broken off all communication with Boehm, as a man who had shown himself capable of grossly abusing his confidence; instead of this, however, the only effect which the new instrument appears to have had upon him was to

[11] It is a tradition in the house of Rudall and Co., that the former heads of the firm worked for Gordon.

[12] "About the year 1831, we constructed a flute under the direction of Captain Gordon, of Charles Xth's Swiss Guards, who had been experimenting on the matter for some time. In this flute, the apertures were placed consistently with the proper length of tube required for each fundamental note in the chromatic gamut; and the captain contrived a method of acting upon the additional apertures beyond the number of fingers. With this flute the captain returned to Paris. Mr. Boehm was at the same time trying to improve the flute, or to remodel it; and it is said, with some reason, that he adopted a great part of the captain's contrivance. Upon this matter much has been said and written, and although some points were never clearly ascertained, we must give our decided opinion that Gordon is entitled to most credit in the affair."—*Ward*, '*The Flute Explained*,' p. 9.

[13] "He went to Munich to be near M. Boehm, who had a workman who was the only person who could assist him in the construction of the flute he had invented."—*Madame Gordon's letter*, p. 81.

unsettle his views with regard to his own flute, and to suggest further modifications and improvements.[14] Boehm assigned him a room[15] in which, with the assistance of his best workman, he could make fresh experiments in privacy. He gave him, moreover, every facility for carrying out his new ideas, even permitting him to transfer to his now remodelled flute some of his own fingering.[16]

[The following is a more detailed account of Gordon's proceedings at this time :—

As Gordon's object in calling upon Boehm in London was to consult him about his flute, we may take it for granted that he mentioned the difficulties he had encountered in getting its mechanism constructed to his satisfaction. We know that he admired the workmanship of the instrument on which Boehm was playing, and that Boehm offered to make a flute for him on his own model; also that he told him that he, too, intended, on his return home, to construct an improved flute, and that he promised to send him one of the perfected instruments.

Boehm left London for Munich, and, shortly afterwards, Gordon returned to Paris. Here he employed himself in constructing a flute, for he was learning the art of flute-making.[17] About

[14] See p. 96.

[15] Boehm pointed out to me the situation of this room. It was in the upper part of the house.

[16] The back-fingering for F sharp, and the D shake (see p. 74).

[17] His good wife, with pardonable pride, believed that he ulti-

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He imagined that, as soon as his "beautiful instrument"[20] became known, players would flock to purchase it, and it was his dream, after taking out a patent, to establish, with the assistance of Boehm's workman, manufactories in London, Paris, Vienna, and the other chief cities of Europe,[21] and so to realise an income to replace that of which, through no fault of his own, he had been deprived.[22]

Alas, poor man! he knew nothing of the world, and little thought that, even if his invention had been all he fondly believed it to be, it would still be necessary to set in motion hidden wheels to launch it and keep it afloat amidst the billows of prejudice and interest.

In London, according to Schafhäutl, Gordon met Boehm,[23] and so the two inventors must have been endeavouring simultaneously to introduce their rival flutes to the English public.

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[20] p. 81. [21] pp. 85, 81. [22] p. 81. [23] p. 108.

Gordon remained in England until his stock of money was exhausted, and then rejoined his wife and children at Lausanne, wofully disappointed at his want of success.[24] Indeed, it appears to be not improbable, judging from an expression used by Madame Gordon, that he was suffering from an attack of melancholia. However, he threw off his despondency, and it seems that he returned to Munich and resumed his flute-making, for Boehm offered to produce evidence to prove that he was there in 1834.[25] His stay at Munich is variously stated at six, nine, and twelve months, and if we regard his visit to London as a break in his residence there, it may serve partly to account for this discrepancy.]

We must now pass over a period of four or five years. In the interval Gordon had lost his reason. The Boehm flute had been slowly but steadily gaining ground, particularly in France. A demand for it was springing up in Paris, and in 1838, M. Coche, professor of the flute at the Conservatoire, entered into an arrangement with M. Auguste Buffet, jeune, a Parisian musical instrument maker, to establish a Boehm-flute manufactory. Boehm had not protected himself by a patent, so that there was nothing to stand in his way; and accordingly he assured the public that Boehm's instrument had been copied "with an exactitude truly scrupulous," though, as a matter

[24] See Madame Gordon's letter, p. 82. [25] p. 85.

of fact, there were some mechanical differences in the shape and position of the keys.

In order to insure the sale of his flute, he had recourse to an expedient, which, however clever it might have been as a mode of puffing, raised a great prejudice against Boehm. He published an engraving, representing three flutes side by side. They were styled respectively, Invention, Modification, Perfectionnement. The first designation was applied to Gordon's, the second to Boehm's, and the third, it is needless to say, to his own flute. Now, had he wished to show that the invention originated with Gordon, he should, of course, have selected for his illustration one of Gordon's early instruments, before he had been influenced by Boehm; instead of this, however, his drawing represents one of Gordon's later flutes, to which he had applied Boehm's fingering, and hence this engraving has proved an endless source of error and confusion;[26] surely, however, M. Coche, who was deriving a profit from Boehm's invention, should have been the very last to raise the cry of "Wolf!"

As for Gordon, his bravery, his simplicity, his misfortunes, his ingenuity, and his perseverance gained

[26] One of these pictures may be seen in Coche's Method; to this however, is appended the following footnote: "(N.B.) *La Clé du Fa♯ et la Clé du Trille du Ré appartiennent à M. Boehm.* (Tablature Gordon)." In Coche's pamphlet there is another of these engravings representing the three flutes, without any such explanation, but only a mercantile announcement relating to the moderation of the price of Coche's flute.

him many friends, and excited universal sympathy. No one speaks more highly of him than Boehm. When expressing his regret, as he does in defending himself, that Gordon's lips were sealed, those lips which alone could free his character from the calumnies with which it had been assailed, he says of him that he was as honourable as he was modest.

In the revolution of 1830, when Charles X. lost his throne, and Gordon's professional career was brought to a close, his reason sustained a shock from which it never quite recovered. On Thursday, the 29th of July, the Swiss Guards, in which he held a commission, were suddenly seized with panic in the courtyard of the Louvre, which they had bravely defended all the morning, and made a rush, pell-mell, for the portal leading into the Place du Carrousel. Those who failed to get through were quickly despatched by the rebels, who, in the demoniac frenzy which breaks out at such times, instantly stripped the bodies of the fallen soldiers, placed their helmets on their shaggy heads, and arrayed themselves with tattered fragments of their gory uniforms.[27] Mr. Cornelius

[27] "The Tuileries Gardens in Marmont's rear were thus left unprotected; and the marshal, to provide their defence, was obliged to recall one of the Swiss regiments, which then guarded the Louvre. The commander thought it best to send away that regiment which had all the morning resisted the assailants from the colonnade, and to replace it by the other which occupied the great court. Orders to this effect being given, the Swiss soldiers manning the colonnade withdrew with alacrity, whilst those who were to

Ward, the inventor of Ward's Chromatic Flute, who made an instrument for Gordon in 1831, says of him: "He was considered to be of unsound mind, and that he was thus affected on account of the defeat of his comrades, and his own loss of fortune, in the revolution of July. He was generally treated with consideration on that account; but very little attention was paid to his flute mania, such being the light in which his views respecting the flute were regarded." But he adds—"We consider it due to Captain Gordon, to state, from our own personal knowledge, that he was an ingenious, rational, and kind-hearted gentleman." [28]

His affectionate wife relates in touching language,[29] how he had no sooner finished his flute,

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replace them proceeded to do so with no alacrity whatever—so much so, that the colonnade for an interval remained undefended. The people behind the barricade opposite were not slow to perceive the suspended fire. The boldest advanced to the gate of the Louvre, near which a wooden trough for shooting rubbish was left standing, and afforded a communication with the colonnade above. Some of the mob soon climbed it, rushed through the apartments of the Louvre, and showed their shaggy heads and menacing guns through the windows. The Swiss soldiers still in the court perceived this, and cried out that the palace was taken; in a trice a panic seized them, and all who could fled through the portal into the Carrousel. The mob, still more alert, had already broken in, and little mercy was shown the unfortunate Swiss who remained behind. In a few minutes their naked bodies covered the court, whilst red fragments of their uniforms adorned the breasts, as broken helms the heads, of the victors."—*Crowe's 'History of France,'* vol. v. p. 401.

"By a strange coincidence they passed over the same spot where their predecessors had gloriously fallen on the 10th of August 1792. —*Alison's 'History of Europe,'* vol. iii. p. 531.

[28] 'The Flute Explained,' p. 10.

[29] In her letter to Coche, p. 82.

than he went from Munich to London to bring out his invention; how, owing to his retiring disposition, his inexperience of the world, and his want of introductions, he saw his pecuniary resources melt away before he had succeeded in making himself known; how he returned to her and his children at Lausanne, ill and disheartened; how afterwards, in endeavouring to make his flute still more perfect, he cracked the instrument, which had cost him so much pains and so many sleepless nights; how, though overwhelmed with distress, he set to work with unabated ardour to construct another; and, finally, how the difficulties he encountered, all unaided, in the undertaking, added to the opposition and hostility his schemes had raised against him, brought about, by little and little, an alteration in his intellectual faculties.

HISTORY OF THE BOEHM-GORDON CONTROVERSY, WITH AN INQUIRY INTO THE ORIGIN OF RING-KEYS.

THE creed of the Gordonites is embodied in a sarcastic taunt addressed to Boehm by M. Coche, Professor of the Flute in the Conservatoire of Paris, by whom Gordon's cause was first espoused. "They say in musical society (*le monde artiste*)," he wrote, "that the flute which bears your name, was discovered by a person of the name of Gordon, an old pupil of Drouet." [1]

On the other hand, the learned Carl von Schafhäutl, "Doctor and Professor in the Royal Bavarian Academy, University, and Conservatorium," Boehm's mathematical tutor and friend for upwards of half a century, thus propounds the belief of the Boehmites, of whom he is the champion: "That such a man [as Boehm] should have borrowed from others the ideas upon which he founded the construction of his instruments, is what no one can seriously believe." [2]

As is often the case where such wide differences

[1] p. 106. [2] p. 112.

of opinion exist, the truth lies between these two sweeping assertions.

To say that the Boehm flute was discovered or invented by Gordon would be an exaggeration, even if it could be established that he was the originator of the ring-keys, as is assumed by Coche,[3] and of the open-keyed system of fingering, as is asserted by Clinton;[4] but as these two statements, as has been seen,[5] cannot be substantiated, the expression warrants the use of still stronger language.

Boehm, however, admits[6] that one of the two causes[7] which operated in inducing him to abandon the old familiar fingering, was the impression he received, on seeing the ingenious attempt at improvement which Gordon showed him, when he called upon him, during his visit to London in 1831, to consult him about the manufacture of his flute. That Gordon exercised an influence on Boehm is therefore undeniable; but to what extent he influenced him will now never be known with certainty. Many are the surmises and conjectures which have been made on this subject.

[3] p. 80.

[4] "We find, practically, there are but two systems of fingering in existence; that of the old eight-keyed flute, and that of Gordon, known in this country as the Boehm flute—the former being on the *shut*, the latter on the *open*-keyed principle."—*Clinton's 'Hints to Flute-players,'* p. 1.

[5] p. 22. [6] p. 21.

[7] The other being Nicholson's flute with its large holes and powerful tone.

In support of one of them, some show of reason has certainly been adduced (p. 22); and it will presently be seen that Boehm's ideas regarding the reformation of the flute underwent a material change, to whatever cause it may be assigned, soon after he became acquainted with Gordon.

A most novel and original part of Gordon's invention was a plan for carrying the motion of the fingers from one part of the flute to another by means of wires and cranks, or angular levers (the same in principle as those used in bell-pulls) attached at one end to the valves to be acted upon, and at the other, either to terminations representing the ends, or "tails," [8] of the keys of the old flute, or else to crescentic expansions partly encircling the holes.[9] By this means, the pressure of the finger was communicated to a crank, which pulled a wire, and this, in turn, acted on another crank, which set the valve in motion.[10]

Although Gordon employed the best workmen he could obtain in Paris and London, he failed to

[8] Fig. 7, p. 74, *l*, *m*, *n*.

[9] Fig. 7, *r*, *s*, *q*. According to Schafhäutl, Gordon took the shape of these crescents from that of the waning moon "five days before the new moon," p. 110.

[10] These wires and cranks may be seen on Ward's chromatic flute. On this instrument the low C and C sharp valves are closed by the left thumb, and consequently the action has to be carried a very long distance. For this purpose Ward has adopted Gordon's contrivance, but for the rest of his mechanism he has recourse to the usual rods or axles and ring-keys. Two of his keys, those for G sharp and E flat, are on the objectionable double-action Dorus plan, first devised by Gordon, see p. 74.

get his mechanism constructed in such a way that it would act with sufficient certainty to admit of rapid execution;[11] but, notwithstanding its failure, he clung to it with extraordinary tenacity. He was ready to take Boehm's advice on other points, but he was obstinately bent on following out his own ideas as to the mechanism of the keys.[12] He adopted Boehm's fingering for F sharp, but he rejected the three rings of the mechanism by which this note was produced, and substituted for them three of his beloved crescents; and even Boehm's little D-shake key reappeared on his flute mounted with two cranks and a wire.[13]

The crescents had this in common with the ring-keys employed by Boehm:[14] they enabled a finger, when closing a hole, to close, by the same movement, one or more other holes, not necessarily close together, so that one finger could do what it had previously required two or more to accomplish. Now as this power, which virtually increases the number of the fingers, lies at the foundation of the Boehm system of fingering, and constitutes an essential part of the invention, it becomes of importance to trace with care the origin of ring-keys.

First, then, the ring-keys have been supposed to be only a modification of Gordon's crescents. It has been thought that Boehm, seeing Gordon's

[11] p. 80. [12] p. 84. [13] See Fig. 7, *a*.
[14] See his flute, Fig. 6.

ingenious but clumsy device, seized his idea, developed the crescents into rings by extending them round the holes, and substituted improved mechanism for the unsatisfactory wires and cranks.

This is the explanation [15] put forward by Coche, and it has been accepted, without examination or inquiry, by Fétis [16] and many others,[17] who have written on the subject.

Coche, however, brings forward nothing in proof of his assertion, but assumes that, as Gordon was the first in the field, the crescents must necessarily have given rise to the rings. His argument, if argument it can be called, appears to be this: Gordon made crescents before Boehm made rings; therefore the crescent is the parent of the ring.

It would not be difficult to show the illogical nature of such a position as this, and we know that it was Gordon's habit to replace rings by

[15] See the extract from his pamphlet, given in the Appendix, p. 80.

[16] 'Biographical Dictionary of Musicians,' 2nd edition (articles "Boehm" and "Gordon").

[17] "Le premier essai fut tenté par un de mes élèves nommé Gordon, Capitaine aux Gardes Suisses en France. . . . . C'est sur cette première donnée que la flûte Boehm a été conçue. L'auteur de ce nouvel instrument, homme d'une grande intelligence, a cherché quel était le meilleur parti à tirer du système de son devancier. Il l'a perfectionné; mais, bien qu'il soit arrivé à d'heureuses modifications, il a négligé deux points essentiels savoir: la conservation du son et la simplicité du doigté ordinaire."—*Tulou, from the Introduction to his Method.*

"L'idée de Gordon, exploitée et modifiée par Théobald Boehm, donna naissance aux flûtes *à anneaux*."—*Choquet, 'Catalogue of the Museum of the Conservatoire of Paris,'* p. 62.

Compare Grove's 'Dictionary of Music and Musicians' (articles "Flute," "Gordon").

crescents; it is, however, unnecessary to discuss the question further, because there is good reason for believing that Boehm had made rings before he saw Gordon's crescents.[18]

Secondly, Schafhäutl and his followers would have us believe that the ring-key is an original idea of Boehm.

I find, however, no countenance for this view in the account given by Boehm of the first construction of his new flute. He speaks not of *inventing* the ring-keys, but of *deciding on* and *choosing* them. He says: "On my return to Munich I set to work, and after a careful examination and numerous trials of ways of boring holes[19] and different kinds of mechanism, I *decided on* (*je me fixai à*) the system of ring-keys as best calculated to fulfil all the requirements—a system which I had already had in contemplation before 1831."[20]

Again: "The position of the holes being new, a new fingering was requisite.

"This task was the more difficult to accomplish, as the thumb of the right hand serving to hold the flute only, there remain but nine fingers for fourteen holes. It was necessary to combine mechanism which should make up for this dispro-

[18] See p. 23.

[19] "*Ways of boring holes.*" I have translated the word "*perces*" in this way, because the context shows that Boehm does not refer to the bore of the interior of the flute. He probably contemplated the idea of boring the holes obliquely. (See p. 57.)

[20] For the original French, see p. 95.

portion, and I *chose*, after a mature examination, ring-keys."[21]

If this is not the language of an inventor, an expression which Boehm uses in speaking of the mechanism he saw on Gordon's flute, when it was first shown to him in London, in 1831, is still more significant. "The E hole of his flute," he remarks, "was bored lower down and larger than usual, and, to avoid the lever of the F, he had *adopted* a ring-key. He had also made a number of levers *ingeniously conceived* (*imaginés*)."

It will be observed that Boehm does not say that Gordon had *conceived* his ring-key, but that he had *adopted* it; a term implying that, in his opinion, it was not an original but a borrowed idea, and involving the admission that he knew of a source from whence it might have been derived, although Gordon had constructed it before even the first model of the Boehm flute had been made.[22]

[21] "La position des trous étant nouvelle, il fallait un doigter nouveau.

"Cette tâche était d'autant plus difficile à accomplir, que le pouce de la main droite servant exclusivement à maintenir la flûte, il ne reste que 9 doigts pour 14 trous. Il fallait combiner un méchanisme de clefs qui suppléât à cette disproportion, et je choisis, après un mûr examen, des clefs à anneau."—'*De la Fabrication des Flûtes*,' p. 18.

[22] As Gordon was never known to use rings, this key was, in all likelihood, crescentic in shape; yet Boehm calls it a ring-key. This expression, coupled with his belief that Gordon's contrivance was an adoption, may be taken to indicate that Boehm looked upon the crescent as a modified form of ring.

Thirdly: The view I am inclined to take as most consistent with all the facts of the case, as far as they are at present known, is that ring-keys existed before either Gordon or Boehm undertook the reformation of the flute; but their value not being as yet recognised, they had not come into use, but had remained comparatively unknown, until their importance was practically demonstrated by Boehm.

If this supposition should be correct, their origin is involved in obscurity; but in tracing the history of an invention, we often find that it is preceded by ingenious attempts, which come near, without actually attaining the end aimed at, but which subsequently serve the inventor as stepping-stones, enabling him to reach the goal he has in view.

In connection with the mechanism of the flute, we may instance, as one out of many, an improvement of which we catch a glimpse in a passing notice by Ward, made by a person whose name he does not think it worth while even to mention.[23]

[23] "The first truly scientific remodelling of the flute with which we are acquainted, was made in 1803. It was a great improvement on the ordinary flute, inasmuch as the apertures were placed more nearly in accordance with the acoustical principles of the instrument. The manner of acting on the extra apertures was not, however, so complete as could be desired, from the want of a little mechanical skill in the party who devised it. We have one of these flutes at present by us; but, notwithstanding its superiority, it never came into use, from the obstacles before alluded to, and because the time had not then arrived when such an important improvement would be appreciated."—*Ward*, '*The Flute Explained*,' p. 9.

The abortive efforts of Gordon also properly belong to this class, and his name, too, would probably have been forgotten long ago, had it not been rescued from oblivion and brought into undue prominence by Coche.

I am disposed to think that it is to some one of the many unknown workers in this field that the first idea of a ring-key should be attributed, and that the way had thus been paved for a man of genius; the materials were lying ready for his hand, and what Boehm did was to fit the crown to an arch, to which many builders had each contributed a stone.

[Having thus come to the belief that ring-keys were of earlier origin than is generally supposed, I began to make search, in the hope of finding them on an instrument of a date anterior to that of Boehm's invention. I commenced in London, but not meeting with success, during a recent visit to Paris I made an examination of the extensive and interesting collection of flutes, hautboys, and other wind instruments in the Museum of the Conservatoire, every facility for doing so having been most courteously afforded me by the amiable and learned Curator, M. Chouquet.

I was still unsuccessful; another day, however, when calling on M. Buffet, jeune, the well-known musical instrument maker, I took the opportunity of asking him if he had any knowledge of ring-keys before he saw them on the Boehm flute. He

replied that, in the year 1826, he had in his hands a clarionet, on which there was a ring-key. This clarionet, he further informed me, had been made by Lefèvre, and belonged to a M. Blève, a clarionetist of Havre. He was quite sure that Berr knew of the existence of this ring-key, for it had subsequently formed the subject of a correspondence between him (Buffet) and Berr; but Berr did not adopt it because he considered the old plan preferable.

The next day, acting on a suggestion of Buffet, I went to see M. Biè, the successor of Lefèvre; but he was not able to give me any further information, the circumstances to which I referred having taken place before his time. Afterwards, however, I most unexpectedly obtained a clue to M. Blève himself.

Whilst conversing with M. Chouquet, I happened to mention what Buffet had told me, and he informed me that, in his youth, he had resided at Havre, and that he was acquainted with M. Blève. He said he believed that, though very old, he was still alive, for he had met him not many months ago; he had retired from the musical profession, and was living in Paris.

I now returned to Buffet, and told him what I had heard. He recollected that he had the address of a son of M. Blève, and he was so good as to write to him; but he received no answer to his letter, and thus I lost all trace of a

piece of evidence which would doubtless have established beyond cavil the soundness of my opinion on this subject.[24]]

Boehm completed his flute in December 1832.[25] A few months' practice enabled him to play upon it, and in 1833 he went to London with a view of bringing it into notice. He came to London again in the autumn of 1835, and remained until the following spring, but he met with so little success, that it is said, that during these two visits, he disposed but of one instrument;[26] and it was not until 1841 that the Boehm flute began to come into use in England, it having been adopted in that year by two professional players, Messrs. Carte and Clinton.

It was introduced into France, however, somewhat earlier than this. In 1837 (some say 1835) M. Camus brought a Boehm flute to Paris; and placed it in the hands of M. Buffet, a very clever musical instrument maker, who, next to Boehm, has played the most important part in the

[24] Quite lately, in continuing my search for early ring-keys, whilst ransacking the records of the Patent Office, I have come upon the description of one in the specification of a patent taken out in 1808, a time when Boehm and Gordon were boys.

As this work, though nearly ready for the press, was not in the printer's hands, I have been able to include a drawing of it amongst the illustrations, where it forms Fig. 3.

It throws a light on the origin of the rings. They were at first, not crescents, but *perforated keys*.

[25] p. 108.

[26] See Clinton's 'Treatise on the Flute,' p. 20.

The Boehm flute was exposed for sale at Gerock and Wolf's, in Cornhill.

attempted reformation of wood-wind instruments. Buffet carefully copied it, and subsequently made and patented important improvements in the mechanism, three of which are in universal use at the present day.[27]

Auguste Buffet, jeune, from a photograph taken in 1862.

Buffet's flute was taken up by Coche, who, as I have already said, was the Professor of the Flute

[27] They are: 1. The "needle-springs." 2. The "clutches," or pieces of correspondence, to supersede the arms employed by Boehm (see Fig. 6). 3. The "sleeves," or cylindrical tubes encircling the rods or axles; by their means two actions are conveyed on the same shaft.

In 1843, in conjunction with Klosé (see p. 5), he applied ring-keys to the clarionet (Chouquet, 'Catalogue of the Museum of the Conservatoire,' p. 73), and the following year to the hautboy (*ib.* p. 67).

at the Conservatoire, and what follows will be rendered more intelligible, if I mention that he was a man of inordinate vanity; his *amour propre* being so pronounced as to make him many enemies amongst his professional brethren.

By 1838 the Boehm flute had attracted general attention amongst musicians in Paris, and in the month of March of that year, on the invitation of the Minister of the Interior, the invention was brought before the Royal Academy of Fine Arts. But the question which was submitted for examination to the committee, or section of music of the Royal Academy, was not, as one would naturally have expected, the important advance made by Boehm in the construction of flutes and other wood-wind instruments, but "the improvements introduced into the manufacture of the flutes called 'flutes on the Boehm system' by M. Coche."[28]

It was stated that Professor Coche had "presided at the construction" of the flute brought before the committee, and had caused to be added to it "new ameliorations of his own invention." As for Buffet, his name was only mentioned as the maker of the new instrument; it is true that he was admitted to be "one of the most skilful

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Auguste Buffet, jeune, from a photograph taken in 1862.

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manufacturers of the capital," but not a word was said about *his* improvements.

Indeed, one would suppose, on reading the report, that Coche was entitled to almost as much credit as Boehm himself. "But that which ought, it seems to us," I am translating a quotation from it, "to more particularly deserve our encouragement and our eulogies, is the constancy, the tenacity displayed by M. Coche, in causing this happy invention to bear fruit. He carried off the first prize for the flute at the Conservatoire; his brilliant talent has caused him to be nominated there as Professor for the flute class. Well, then! perceiving the importance of the discovery, he has had the courage to give himself up to the study of the new instrument, and to superintend its manufacture, causing notorious improvements to be made therein." [29]

The report was signed by Cherubini, Paer, Auber, Halévy, and Carafa. It had scarcely been issued, when Coche was informed of the experiments which had been made by Gordon, and furnished with drawings of his flute; at the same time several professional flautists boldly declared to him that to Gordon, in their opinion, the invention ought to be attributed. Upon this, he conceived the idea of bringing forward Gordon as the inventor, and of thrusting Boehm into the back-

[29] The report is given in full in the Appendix, p. 75.

ground as a mere modifier, whilst he himself posed before his fellow-countrymen as the perfecter of the new instrument; and in carrying out this design, however indifferent he might have been as a flautist, he certainly displayed diplomatic skill of no common order.

His first step was to write to Gordon, who was known to be living in retirement at Lausanne, in Switzerland. What he said to him, we have no means of knowing. We can judge, however, of the tenour of his representations from the effect they produced on Gordon's wife, into whose hands his letter came, owing to her husband having become deranged.

On reading it, the poor lady came to the conclusion that Boehm, whose flute, it is needless to repeat, had been invented more than five years before, having heard during the winter then just over of her husband's mental affliction, had taken advantage of his helpless condition to appropriate his invention and bring it out as his own, excusing himself on the ground that, by so doing, he was preventing its benefits from being lost to the world. She supposed Coche to be a person permitted by Divine Providence to take up the case, and to frustrate this act of injustice, and she even appealed to the very man, who, according to his own showing, was endeavouring to reap for himself the fruits of her husband's ingenuity,

for advice as to what proceedings she should take to protect his interest from the rapacity of Boehm.

Her ideas she embodied in a letter[30] to Coche, which, of course, admirably suited his purpose. He had no sooner received it than he turned his attention to Boehm, with whom he was not less successful. He wrote to him, and we know from the extract from his letter I have already quoted, given by Dr. Schafhäutl, that he intimated that he was openly accused in Paris of having palmed off Gordon's invention as his own. In answering this letter, Boehm betrayed a want of accuracy which, considering that his honour was at stake, is much to be regretted.

Early in the year 1833 Gordon had written[31] to Boehm asking him to make a flute for him. Boehm had consented, and at the same time had suggested that Gordon should come to Munich and superintend its construction in person: and this Gordon accordingly did.

When referring to these occurrences in his letter to Coche, Boehm represented them to have taken place in 1834, instead of 1833. He thus gave Coche an opportunity of attacking his character as a man of veracity of which he was not slow to avail himself.

[30] This and other letters here referred to will be found in the Appendix, p. 81.

[31] See p. 95.

He was able to produce a letter,[32] written by Gordon in July 1833, which showed that not only was he at Munich at that time, but that his flute was already finished and an announcement of it printed and ready for distribution. Discredit having thus been thrown upon one of Boehm's statements, all the rest were naturally received with incredulity, and those of Madame Gordon, whose letter Coche printed in juxtaposition with that of Boehm, found general acceptance.

In commenting on the letters,[33] Coche assumed an air of lofty indifference, declaring that he was influenced by conscientious motives only, and by a love of truth and justice, as it was really a matter of little importance by whom the instrument had been invented; and, whilst professing to allow the reader to draw his own conclusions from them, he adroitly prejudged the case by bringing forward his own interpretations of controverted points, and speaking of them as if they were self-evident truths.

He further followed up the advantage he had gained by issuing misleading engravings;[34] and, although he professed to consider that it made little difference who was the inventor, he seemed determined that his own views on the subject should be impressed on the student at the very outset of his career, for he published an instruction book under the title of a 'School for the

[32] See p. 86. [33] See p. 78. [34] See p. 29.

New Flute, Invented by Gordon, Modified by Boehm, and Perfected by Coche and Buffet'; indeed, so unscrupulous was he in his attempts to excite prejudice against Boehm, that he did not hesitate to state on the title-page of this book, that the fingering of these three instruments, viz. those of Gordon, Boehm, and Coche, was identical, though, as a matter of fact, no less than five of the notes of the Boehm flute were fingered differently from those corresponding to them on Gordon's instrument.

AN EXEMPLIFICATION OF THE PROGRESSIVE DEVELOPMENT OF MECHANISM FOR THE FLUTE.

The Five-foot Flute.

Exact date unknown.

The plan of employing open keys to act upon two or more of the six holes of the flute, when placed so far from the others as not to be within reach of the fingers, was first carried out on bass flutes. So far from being an idea of recent origin, it seems to have even preceded the invention of the additional keys for the semitones, for it is probable that the flute here represented dates from the end of the seventeenth or the beginning of the eighteenth century.

The instrument from which the drawing is taken was presented to the Museum of the Conservatoire of Paris by M. Dorus. On account of its great length, it is familiarly known as *a five-foot flute.* It measures exactly four feet (English) from end to end, and it requires long arms on the part of the performer. It is made of box,

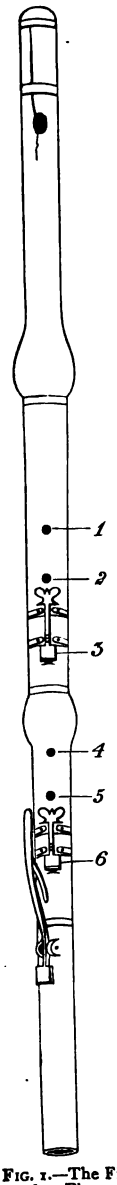


FIG. 1.—The Five-foot Flute.

and the keys are of brass. The maker's name, *J. Beuker, Amsterdam,* surmounted by a crown, is branded upon it. The head is cracked, but it has been carefully repaired and clamped with a brass ferule. It sounds easily, and the tone is full and rich. It is an octave below the concert flute.

The distance between the C sharp and B holes (1 and 2) is two inches and an eighth, and that between the G and F sharp holes (4 and 5) one inch and seven-eighths; an uncomfortable, but possible stretch, in each case, for an ordinary hand. But the space between the B and A holes (2 and 3) is no less than three inches and an eighth, and that between the F sharp and E holes (5 and 6) two inches and seven-eighths. As the A and the E holes (3 and 6) were thus placed quite out of the reach of the longest fingers, it became necessary to have recourse to mechanical means for closing them. The keys employed for this purpose are double levers of the kind commonly found on hautboys of this early period. They terminate, as was usual at the time, in two cusps,

for the accommodation of left as well as right-handed players.

The bore is conical, but funnel-shaped at its lower end, as the following measurements of its diameter will show :—

	in.
At its upper end above the cork	1⅛
At the junction of the first joint with the head	1¼
At the junction of the second joint with the first	1
At the junction of the foot with the second joint	⅞
At its lower end	1

MacGregor's Bass Flute.
1810.

Another step in advance is here made. Two more of the six holes, viz. those for C sharp (1) and ~~F♯ sharp~~ (4), are covered with open keys. Both of the keys now added still survive in an altered form on Carte's, and one of them (that for the C sharp hole) on the Boehm flute (Fig. 6, *c*).

In order to shorten the instrument the bore is doubled in the head. This gives it a singular appearance.[1]

[1] It must not be supposed that these ideas of Mr. MacGregor were new. In Diderot and D'Alembert's Encyclopedia, Paris 1751–80, is an engraving of a bass flute, the bore of which is similarly bent back upon itself in the head, and the same four holes covered with keys, the difference being that single instead of double levers are employed.

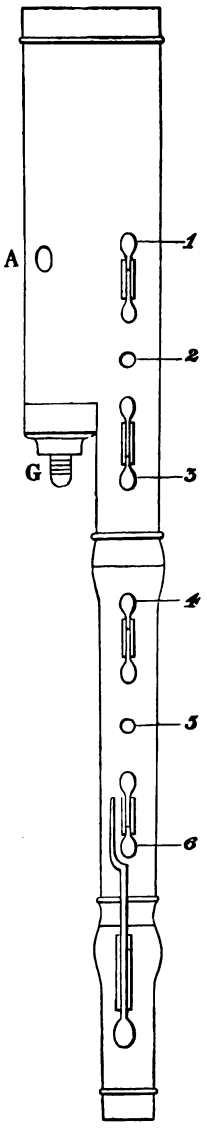


FIG. 2.—MacGregor's Bass Flute.

The patentee, Mr. Malcolm MacGregor, musical instrument maker, of Bell Yard, Carey Street, London, thus describes his invention :—

"Figure 1st represents the form of my new-invented flute of the largest size; it is composed of three joints, but may be made of a greater or less number, as may be judged most convenient; the top joint G, which I call the head, is of an oval or flat form for the accommodation of two calibers or bores, which bores answer similar purposes to the two joints called the head and middle of a German flute having the four usual joints, one of such bores having the mouth hole, the other of such bores having three holes for the left or upper hand. The mouth hole A is placed on the side of the head or top joint G, at a convenient distance from the three holes for the left or upper hand, so as to allow the mouth and left hand to be at a suitable distance from each other, and which they will be by the proportion in

Figure 1 being observed, or nearly so, and so as to allow the body to be in an easy posture. The tone or sound is produced by the wind proceeding from the mouth hole up to the caliber or bore, in which it is made, through the other bore, by means of the communication between the two bores. By thus having the two bores in one joint, the larger sized new-invented flute is much curtailed in length and rendered manageable to perform upon, which would not be the case if such bores were made into two joints. 1, 2, 3, in the same Figure 1, represent the three holes to be played with the left or upper hand; two of such holes, 1 and 3, being acted upon by keys, which are to be so made as to remain open till used; these keys are necessary, owing to the distance which the holes are from each other, being in a new-invented flute of the largest size, about double to that of a concert German flute. The holes 1 and 3 are supposed to be hid in the Drawing by the flaps of the two keys. 4, 5, 6, in the same Figure 1, represent the three holes to be played with the right or lower hand; two of such holes, 4 and 6, being acted upon by keys in the same manner as described as to 1, 2, 3, and the holes 4 and 6 are supposed to be hid in the Drawing similarly to the holes 1 and 3, as before described. The holes 1, 2, 3, and 4, 5, 6, respectively of a new-invented flute of the largest size are about the distance of three inches and one-fourth from each

other. The mode of fingering this flute is similar to that of the concert German flute, except that the keys acting on the holes 1 and 3, and 4 and 6, are to be used instead of the fingers being placed on those holes; the tails of which keys are to be so made as with the open holes to form about the same distances from each other as the finger holes of a concert German flute. The Drawing represents a new-invented flute to produce a bass or an octave below to the German concert flute, having only one key for the D sharp; but if the new-invented flute be required as a bass to a German flute, having keys for more semitones, or descending to C natural below the lines, then corresponding keys must be added on the new-invented flute accordingly. The lengths of the different joints of the largest size of the new-invented flute as described in the Drawing, Figure 1, are as follows:—The head or top, fourteen inches; the second joint, about ten inches; third joint or foot, about seven inches. I have given these and the other different dimensions as near as may be; which, however, the manufacturer will regulate at his discretion, so as to produce the different notes in proper tune. As a general rule it may be observed, that the distances in the largest size new-invented flute between the holes corresponding to the finger-holes to a concert German flute, and between the nearest of such holes to the

mouth hole, and the mouth hole, are about double those of the concert German flute."

MacGregor also proposed to bring the holes within reach of the fingers by boring them obliquely, and so causing them to approach each other in the substance of the wood. This expedient had long before been resorted to in the construction of bass flutes-à-bec and bassoons. The bass flute-à-bec was played with a crook, like the bassoon, but instead of being suspended by a strap round the neck, it was usually allowed to rest on the ground, in front of the performer, the bore terminating in a hole at the side of the instrument.

NOLAN'S RING-KEY.

1808.

In the year 1808, a clergyman, the Reverend Frederick Nolan, of Stratford, near Colchester, took out a patent for "certain improvements in the construction of flutes, flageolets, hautboys, and other wind instruments." These improvements consisted, he states, "in constructing wind instruments, which are modulated by the fingers, on the principle of bringing the semitones, which are generally cross-fingered or played by additional keys, under the modulation of the fingers which play the regular diatonick notes."

Amongst other curious contrivances, which it would be out of place to describe here, was a ring-key. It consisted of a ring surrounding a hole, and an open-standing valve; the two being connected by a lever, which might be either single or double. The ring was made by boring a hole in a key; a circumstance which has an important bearing on the history of the invention of ring-keys.

In the engraving, which is taken from the

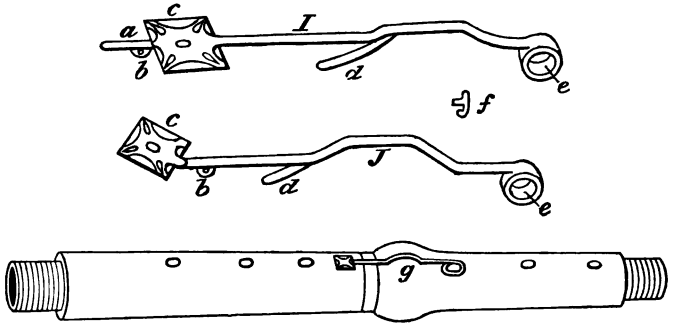


FIG. 3.—Nolan's Ring-key.

specification of the patent, this ring-key, *g*, is shown as applied to a flute for the production of G sharp. The reader will perceive that on raising the first finger of the right hand, a player would pass from F sharp to G sharp (a fingering in use at the present day on Carte's flute), and herein he may discern the germ of the open-keyed system of fingering. But as there appears to be no provision for G natural, he will no doubt wonder how this note was made.

It should be mentioned, therefore, that the valve was only to be left free to act when music was being played in those keys in which there is no G natural. Should G natural, however, occur as an accidental, the performer was directed to place the finger, instead of on the ring, on the lever just above it, and so to close the G sharp hole whilst leaving the G natural hole open. Before commencing to play in a key in which G natural formed one of the notes of the scale, the player fastened down the valve by means of a catch provided for the purpose. Whilst playing, should he meet with an accidental G sharp, he had to touch the catch and so release the valve. This, as well as the construction of the ring-key, is explained by Mr. Nolan, in the specification of his patent, as follows :—

"In order to bring the acute semitone under the modulation of the finger which plays the regular diatonick note, let a perforated key (I) be placed over a hole bored to produce the required semitone between the proper hole and the hole next above it, of the following construction :— Let it be made of a proper length to cover both holes, viz. that sounding the full tone with its touch (*e*), and that sounding the semitone with its valve (*c*) ; let it be so bored through the touch (*e*) as to permit the full tone to pass freely through the perforation (*e*), or to be completely stopped by the finger which presses the key down ; let it have

its hinge (*b*) behind the valve (*c*), its spring (*d*) between the perforation and the valve, and let it be furnished with a projecting tongue (*a*) behind the hinge, to prevent the spring from throwing the touch too high. For the purposes of modulation there should be likewise a catch (*f*) placed behind the touch, which, by turning on a pin or pivot, may fasten down the key when it is fixed to the instrument (*g*) in a box or ball properly placed for the hinge. In place of this key a jointed key (J) of the same kind as those used on the German flute and hautbois may be used when there is sufficient distance between the holes sounding the full tone and semitone to admit of a double lever's being employed. This key should be perforated, as well as the former, and occasionally fastened down by means of a catch. Hence, on loosing the catch, the acute semitone may be produced by the same fingering as the full tone. The accidental of the former is produced by pressing the key towards the valve, and permitting the sound to come through the perforation; the accidental to the latter is produced by touching back the catch, and allowing the key to spring up. This contrivance is principally of use in producing $g\sharp$ on the flute and such instruments, and $f\sharp$ on the bassoon and clarinet, &c.; middle $c\sharp$ on the clarinet may be produced more simply than at present by placing the touch of the key which produces that note under the modulation of the

fourth finger of the right hand, so as to enable the performer to cover the proper hole of that finger while he presses the key, or the former being stopped or plugged up to modulate the latter."

BOEHM'S FIRST MODEL, KNOWN AS GEROCK AND WOLF'S FLUTE.

1831.

This is the flute which Boehm made during his visit to London in 1831.[2] He calls it his first model, and it must have been the instrument which, as he states in his letter to Coche,[3] he showed Gordon when he first became acquainted with him.

The engraving is a facsimile, reduced in size by photography, of a drawing in the prospectus issued by Messrs. Gerock and Wolf. It appeared in the shape of a small pamphlet, entitled "Scale and Description of Boehm's Newly-invented Patent Flute, manufactured and sold by the Patentees only, Gerock and Wolf, 79, Cornhill."[4]

[2] "The first model I made at my friend Mr. Wolf's in 1831, proves that I wanted to preserve as many notes in the old way of fingering as seemed feasible."—*Extract from a letter from Boehm to Clinton, written in March* 1843, *published in Clinton's 'Treatise on the Flute,'* p. 45.

[3] "At that time I had already made in London, the model of my new flute, and I showed him [Gordon] everything that I had done." —*Boehm's letter to Coche.* (See Appendix, p. 84).

[4] This flute was not patented.

The following is an extract from it:—

"The patentees, Messrs. Gerock and Wolf, having availed themselves of the valuable assistance of Mr. Boehm, principal flutist to the King of Bavaria, distinguished not only as a musician but for uncommon powers of mechanical invention, have succeeded in perfecting a flute devoid of those inaccuracies of intonation universally complained of in flutes of the usual formation, and are enabled confidently to invite the attention of the musical world to their new patent flute, in which, by a slight alteration in the form and arrangement of the keys, the following important results are obtained, namely:—

"FIRMNESS, EQUALITY, and RICHNESS of tone, which have never before been combined in any other description of flute.

"SIMPLICITY of mechanism as regards FINGERING.

"Facility in FILLING, producing sweetness and freedom up to the highest C, and unexampled capabilities for the more delicate graces of expression which belong to a finished style of execution.

"It will accordingly be found that the whole construction of the newly-invented scale of this flute tends to a more complete identification with the natural scale of the harmonic succession of sounds, insomuch as by means of the simple F key, as exhibited in the annexed drawing, the hole for the note E is placed in its natural situation,

which gives to it all the power of the E flat and D. Besides which advantages, its peculiar formation has influence upon several of the high notes, which become better in tune thereby, and more pure, easy, and clear in tone; giving at the same time a facility on several shakes or trills, which could never be made on the flute before.

"In all passages of music, likewise, similar to the annexed examples, where the notes preceding or following the F natural require either the G sharp key to be opened, or the sixth hole to be closed with the third finger of the right hand, there is a difficulty on the common flutes in gliding to or from the F natural keys, and a partial unstopping of the intermediate holes, which produces a sound between the respective notes, and requires the skill and practice of a first rate professional artist to surmount the difficulty in such passages of music as are affected thereby; which difficulties and inaccuracies are also obviated by the newly-invented F key as described in the figure subjoined."

On looking at the engraving, it will be observed that the A hole is brought

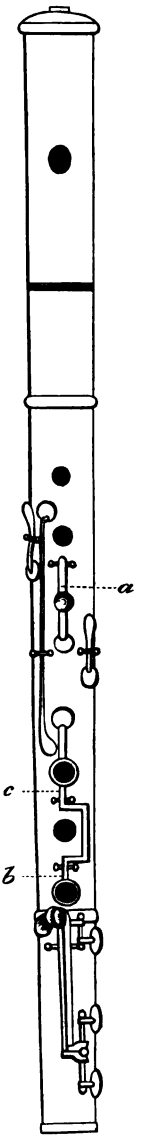


FIG. 4.—Boehm's First Model.

down to its proper place, and that the finger of the performer is enabled to act upon it by means of an open key (*a*), as on the flutes represented in Figs. 1 and 2; but the key, being much shorter than that required for a bass flute, is constructed with a single instead of a double lever. English flute-players are familiar with this key, as it was made use of by Mr. Siccama on his "diatonic flute"—a flute which was adopted by two distinguished professional players, Richardson and Pratten, and became, in consequence, very popular in this country about thirty years ago.

The E hole is also lowered; but instead of employing, like Mr. Siccama, another key of the same kind, Boehm brings down the first three fingers of the right hand, and has recourse to a ring-key, by means of which he effects his well-known back-fingering for F sharp.

The mechanism employed in the construction of the ring-key is very different from that which Boehm afterwards used; indeed the invention, regarded from a mechanical point of view, must be considered to be still only half complete, for the rod, or axle, to which the rings and the valve should be attached, as radii parallel to each other, so as to constitute a lever of the third order, is wanting, its place being supplied by two levers of the first order (*b* and *c*); the action being the same as that of the keys of the two bass flutes,

and of Nolan's ring-key when made with a double lever (Fig. 3, J).

This key for F sharp should, of course, have been constructed with three rings (see the Boehm flute, Fig. 6), but for want of the axle it was impossible, without departing from the simplicity of the mechanism, to employ more than two, the absence of the third being a great drawback to the fingering.

A Flute by Gordon.

This instrument has little in common with Gordon's flute (Fig. 7). Its holes, placed out of line, betraying a want of knowledge of how to regulate the mechanism, and its clumsy, ill-shaped keys form a marked contrast to the elegant and symmetrical work of Boehm's skilful artisan. If not made by Gordon himself, it would seem at least to be the work of some 'prentice hand.

It bears no resemblance to the Boehm flute (Fig. 6), but it is based on Boehm's first model (Fig. 4), which Gordon has apparently endeavoured to reproduce with alterations and improvements of his own.

On comparing it with Fig. 4, it will be observed that, in adopting the back-fingering for F sharp, Gordon has converted the rings into two rude forms (*e*, *f*), intended probably to represent crescents. In connection with these he has made an improve-

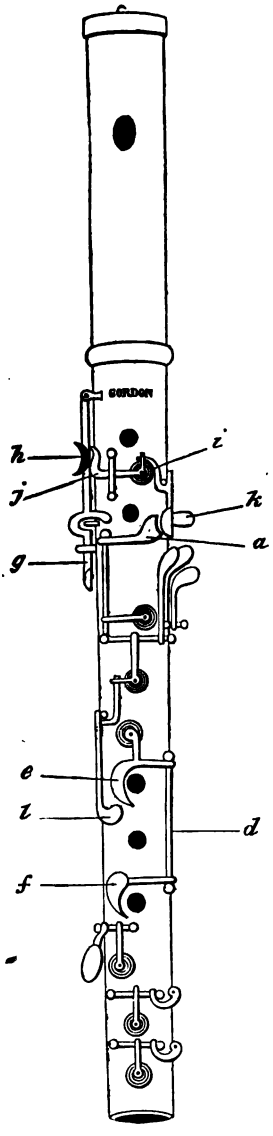


FIG. 5.—A Flute by Gordon.

ment which constitutes an important mechanical advance on Boehm's contrivance. He has replaced the double lever by an axle (*d*).

Now the reader will recollect that it was pointed out in the description of Boehm's first model, that there was a mechanical difficulty which stood in Boehm's way in furnishing this key with more than two rings. By the introduction of the axle this difficulty was removed. Why, then, did not Gordon make use of a third crescent, which would have been of so much service in facilitating the fingering? Was it because the idea of doing so never occurred to him? If so, it is difficult to resist the inference that when he designed this instrument he had not yet seen the Boehm flute (Fig. 6).

If the reader will now direct his attention to the key for covering the A hole

on Boehm's first model (Fig. 4, *a*), and then compare it with the corresponding key on this flute (*a*), he will see that Gordon has again employed an axle, thereby securing a better action.

It may, perhaps, be worth while to mention that Gordon was not the only designer of flute mechanism who carried out this improvement. Boehm's plan for thus acting on the A hole was adopted not only by him, but by Siccama, Clinton, and Pratten. Siccama simply copied Boehm's key, but both Clinton and Pratten made the same change in it as Gordon.[5]

Boehm, having remedied the two most glaring defects of the old flute—the incorrect position and size of the A and E holes—went no further on his first model. Not so Gordon, who made other changes on the flute now before us; but it must

[5] Pratten had recourse to an axle, when he changed the name of the instrument on which he played from Siccama's Diatonic to Pratten's Perfected Flute. Clinton does not deny that he took this key from Gerock and Wolf's flute, as the following passage from his 'Treatise on the Flute' will show: "The A natural hole I have moved lower down upon the instrument than it was upon the eight-keyed flute, which renders that note perfect. This hole is governed by a key, in order that the finger may act upon it without inconvenient extension. The reader, upon referring back, will observe that this key is somewhat similar in principle to that which was affixed to Messrs. Gerock and Wolf's improved flute, but with a much better action. The key upon that flute was set at a sharp angle, which rendered it awkward to control, while on my flute it is placed horizontally, whereby a free action is obtained." The flute here referred to is not that to which Clinton gave the name of the "Equisonant Flute," but an earlier instrument, made for him by the late Mr. Potter, and still manufactured by his son and successor Mr. Henry Potter, of 30 Charing Cross.

be confessed that, considered as improvements, they are of very doubtful value.

Passing upwards from the A to the key next above it, that for B flat, we see that Gordon has substituted an open for the old closed key, and that, with his extraordinary and inexplicable fondness for crescents, he has provided it with a crescentic appendage (*h*) to receive the left thumb, by which it was played, though it is probable that a flat plate would have answered the purpose much better.

Going higher still, we come to the C natural key (*i*). Here Gordon has introduced an entirely new arrangement. This was rendered the more necessary, as Boehm, as we are told by Clinton, who possessed one of Gerock and Wolf's flutes, had, in improving the A, destroyed the C natural, cross-fingered with the middle finger of the left hand, so constantly used by players on the old flute. Gordon employs the closed C natural key of the eight-keyed flute, but he fits it with two levers, one (*j*) for the left thumb, the other (*k*) for the third finger of the left hand. The expanded end of the latter is brought so close to the plate of the A key (*a*), which is cut away to receive it, that the finger can, when required, slide on to it.

For the three lowest notes C, C sharp, and E flat, Gordon has recourse to the same arrangement as that employed by him on his flute repre-

sented by Fig. 7, to the description of which the reader is referred.

The lever *l*, to which no reference has yet been made, was for making G sharp with the first finger of the right hand.

The woodcut is taken from an engraving on the frontispiece of Clinton's 'School for the Boehm Flute.' In the introduction to this work, Clinton publishes a letter from Boehm, dated August 12th, 1845, in which he thus writes: "As some *interested* parties have circulated various unfounded reports respecting my invention, amongst which they have insinuated that it was copied from Mr. Gordon, I have furnished you with the means to refute all such charges, and should you consider it advisable to publish them, or this letter, you have my full permission to do so."

After making some remarks on other matters, Clinton says: "I now come to the most important part of my subject, namely, the invention itself.

"It has been most ungenerously asserted by some parties that Mr. Boehm *copied* his invention from Mr. Gordon, an amateur, and a captain in the Swiss Guards in Paris; while others, with an affectation of indifference on the subject, quietly assert that the same idea suggested itself to both these individuals about the same period, but that Mr. Boehm, having superior knowledge and facilities, realised his conception, and Mr. Gordon did not.

"The facts of the case are simply these: Twelve months after Mr. Boehm had completed his flute, he met Mr. Gordon in London, who was then busily occupied in devising a reformation of the flute; Mr. Gordon, thinking that Mr. Boehm's workmen were more likely than any others to carry out his ideas, requested permission of the latter to complete his instrument at the manufactory in Munich, which favour was unhesitatingly granted, and in 1834, Mr. Gordon's instrument was completed, which he called the 'Flûte Diatonique,' a drawing of which is given in the frontispiece. By comparing Mr. Gordon's flute with that of Mr. Boehm, it will be found that every part of it is *totally different*, excepting that which is acted upon by the first, second, and third fingers of the right hand; and even this part, although the same in principle, is differently worked in detail; however, this is the *only* part which could possibly justify any assertion that Boehm had copied from Gordon. Now, to prove that even this part of the instrument originated with Mr. Boehm, Mr. Gordon had thus written: 'La suppression des deux clefs de Fa naturel, et leur remplacement par une clef de Fa dièse, est une idée dont l'application offre de grands avantages. L'idée de cette clef de Fa dièse, communiquée par M. T. Bôhm de Munich, a été, avec son agrément, adoptée pour la présente

flûte, dont elle complète les moyens d'exécution.' The original of the above is in my possession, and the following is a translation: 'The dispensing with the two keys for F natural, and replacing them with one key for F sharp, the application of which offers great advantages, was an idea suggested by Mr. Boehm, of Munich, and has been, by his consent, adopted on the present flute, thereby rendering the means of execution perfect.'

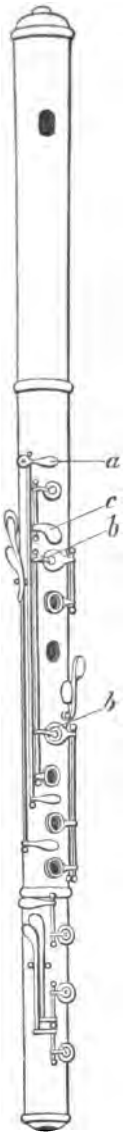
"It is now confidently hoped that this honourable acknowledgment from Mr. Gordon himself will establish Mr. Boehm's just claim to the invention. I likewise possess other proofs, equally satisfactory, but the above may be deemed sufficient on this point."

The Boehm Flute.

1832.

The engraving represents this instrument in its original form. It was finished in December, 1832, and it made its appearance in 1833.

The change of fingering for the right hand, introduced on Boehm's first model (Fig. 4), is here retained. The ring-key is now constructed with an axle, and a third ring is added to the mechanism for F sharp.



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[6] p. 22, note 7. [7] Invented by Buffet of Paris, p. 44.

GORDON'S FLUTE.

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On this flute the open-keyed system attains its full development. Every one of the keys (with the exception, of course, of that for the shake), including even the E flat, which Boehm did not alter, stands open when not in use. In its fingering it departs still more widely from the old system than does the Boehm flute; for though it retains one fingering (that for G sharp) which Boehm changed, it changes three (E flat, low C and C sharp) which he retained.

It was made in Boehm's factory at Munich, where it must have been seen by Schafhäutl, for he mentions its five crescents (*h*, *j*, *r*, *s*, *q*), and the ends of the three keys (*q*, *t*, *s*), close together above the D sharp hole *x*.[8]

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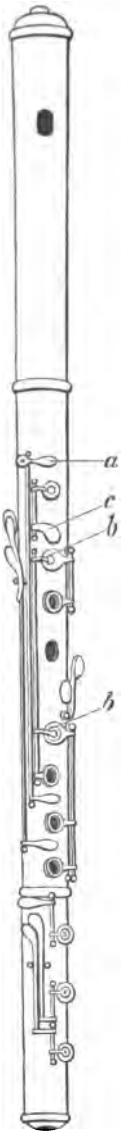

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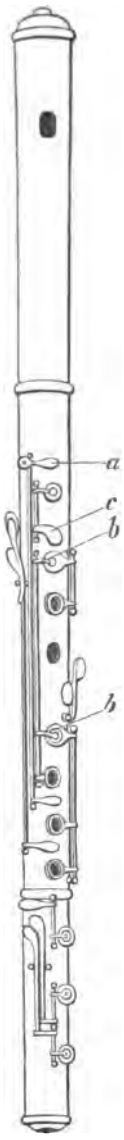

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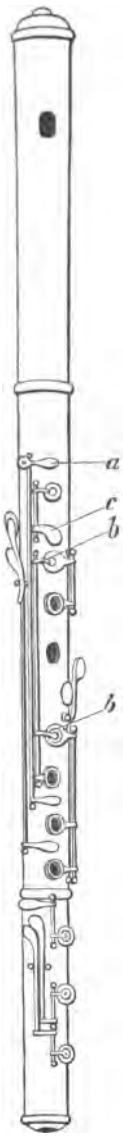

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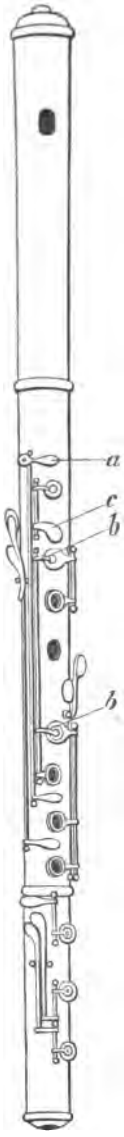

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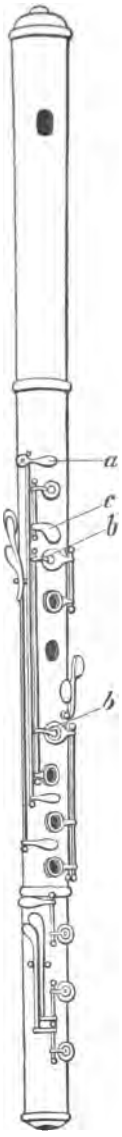

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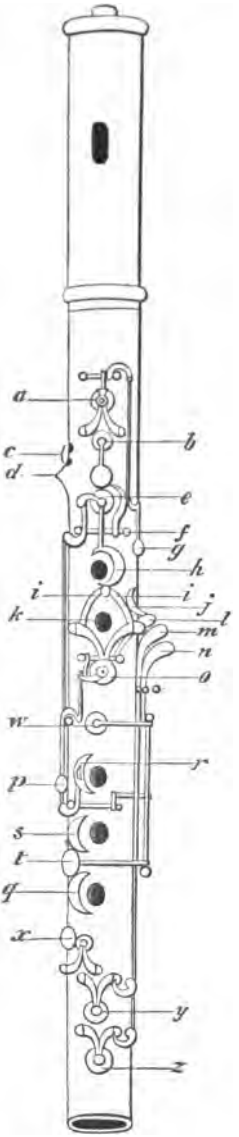

FIG. 7.—Gordon's Flute.

EXPLANATION.

a.—D-shake key taken from the Boehm flute; the mechanism altered to Gordon's system of wires and cranks. It was played by means of the knob, or button, *g*.

b.—Key to close the C sharp hole. This very long key worked upon the axle *f*; its shank was brought round the key *e* by a sickle-shaped curvature, underneath which was the spring.

c.—Two small holes for C natural. They were closed by the left thumb.

d.—Projection in the wood to keep the thumb in its place.

e.—Key for closing the B natural hole. B flat was made by closing this key by the first finger of the right hand, the action being brought up from the crescent *r* by wires and cranks.

h.—Crescent to close the key *e*. There must have been some contrivance not shown in the engraving for reversing the action.

o.—G sharp key. This key was open when in repose, but when the finger was applied to the hole *k*, it was carried down and closed by means of the arms *i*, *i*, one of which was furnished with a small crescent *j*. This double-action key, with simplified mechanism, was afterwards known as the Dorus key.

l.—Tail of the G sharp key.

m, *n.*—Tails of the low C and C sharp keys, communicating with the valves *y*, *z*, by wires and cranks.

p.—Knob for shaking G and G sharp with the first finger of the right hand.

w, *r*, *s*, *q.*—Mechanism for F sharp. The fingering taken from the Boehm flute, the rings replaced by crescents.

t.—Button to make F sharp without using either of the crescents.

x.—Open-standing E flat key.

APPENDIX.

INSTITUT DE FRANCE.

ACADÉMIE ROYALE DES BEAUX-ARTS.

Le Secrétaire perpétuel de l'Académie certifie que ce qui suit est extrait du Procès-verbal de la Séance du Samedi, 24 *Mars* 1838.

MESSIEURS,

D'après l'invitation qui vous a été faite par M. le Ministre de l'intérieur, vous avez renvoyé à votre section de Musique l'examen des perfectionnemens apportés dans la confection des Flûtes, dites *Flûtes selon le système de Bôhm*, par M. COCHE, professeur de flûte à notre Conservatoire de Musique, et auteur d'une Méthode ayant pour but de faciliter l'enseignement et l'étude de ce nouvel instrument. Nous nous sommes occupés de cet examen, et je vais avoir l'honneur de vous donner lecture du rapport dans lequel votre section de musique a consigné son opinion sur les mérites de cette flûte et ceux de la méthode composée par M. Coche.

L'instrument de musique auquel on a donné le nom de flûte est sans contredit, l'un des instrumens le plus anciennement créés, et, depuis la flûte de Pan jusqu'à celles en usage maintenant, et que l'on nomme *flûtes traversières*, par la raison qu'on les joue en *travers*, la forme et les moyens d'exécution sur cet instrument ont

continuellement éprouvé de grands changemens, et l'on ne peut douter que ces divers changemens n'aient toujours eu pour but celui de chercher à corriger les vices d'intonation inhérens à la construction des anciennes flûtes. Nous pensons que l'inventeur de cette nouvelle facture a atteint ce but ; et nous allons vous donner connaissance des moyens qu'il a su employer pour y parvenir.

Les personnes éclairées, savantes ou artistes, ont toujours pensé qu'il serait presqu'impossible de parvenir à construire une flûte qui d'après les lois de l'acoustique, fût reconnue parfaitement juste dans toute l'étendue de son diapason, et que souvent elle ne nous paraissait l'être que par l'habileté du virtuose exécutant, et ils appuyaient cette assertion des raisons suivantes. L'un d'eux, le célèbre Charles, votre illustre confrère à l'Académie des sciences, grand amateur de musique et jouant assez bien de la flûte, nous disait, en causant avec nous, qu'il avait grand regret d'avoir étudié cet instrument plutôt que le violon, instrument sur lequel on peut parvenir à jouer rigoureusement juste, au lieu que sur la flûte cela lui paraissait impossible, par la raison que sa construction était vicieuse en plusieurs points. 1°. Que l'embouchure offrait une grande difficulté à vaincre, celle de l'insufflation, car pour introduire la colonne d'air dans le tube, on ne peut éviter d'en perdre une partie qui passe à l'extérieur, et que par ce fait, inévitablement on détruisait une portion de l'intensité du son et les moyens de la maîtriser avec sûreté ; 2°. que la perce des trous était mathématiquement et acoustiquement parlant, vicieuse, car le placement des trous n'y a été calculé que sur l'extension possible des doigts de l'homme, et non d'après les lois immuables de la physique ; 3°. que dans toute l'étendue de son diapason, il y avait beaucoup de sons vagues, surtout ceux que l'on veut faire entendre dans la partie grave de l'instrument, et que ceux de l'aigu l'étaient souvent par trop ; enfin que tous les sons des divers registres de la

flûte ne semblaient pas tous être de la même famille ; 4°. qu'il y avait impossibilité de faire sur telle ou telle note des trilles, improprement appelés cadences ; et qu'en définitive, malgré la légèreté, la douceur de ses sons, la flûte resterait un instrument imparfait jusqu'au moment où un homme ingénieux trouverait les moyens de corriger tous ces défauts, et des artistes habiles et assez courageux pour abandonner leurs vieilles habitudes et mettre en lumière les inventions nouvelles et utiles dans la culture des beaux-arts.

MESSIEURS :

Nous croyons que les vœux du grand physicien sont enfin exaucés et que tous les vices signalés par lui sont détruits. La flûte que nous avons l'honneur de vous présenter aujourd'hui fut construite d'après les procédés de M. Bôhm par M. Buffet jeune, l'un des plus habiles facteurs de la capitale ; le professeur Coche a présidé à cette construction et y a fait ajouter de nouvelles améliorations de son invention.

Pénétrés de l'excellence de cette découverte, plusieurs de nos virtuoses les plus renommés veulent en faire l'application à la facture des divers instrumens sur lesquels ils se sont illustrés, M. Brod, pour les hautbois ; M. Berr, pour les clarinettes ; M. Gebauer, pour les bassons, etc. Ce concours d'approbations artistiques est déjà une sûreté des mérites de l'invention ; mais ce qui nous semble devoir plus particulièrement mériter nos encouragemens et nos élôges, c'est la constance, la ténacité que M. Coche a mises à faire fructifier cette heureuse invention. Il a remporté le premier prix de flûte au Conservatoire ; son beau talent l'y fit nommer professeur dans la classe de flûte. Eh bien ! sentant l'importance de la découverte, il a eu la courage de se livrer à l'étude du nouvel instrument, d'en surveiller la fabrication en y faisant faire de notoires perfectionnemens, et surtout ce

qui nous parait être un travail des plus utiles en cette circonstance, c'est la Méthode qu'il a composée ; elle nous a paru être rédigée avec clarté et les préceptes y être toujours appuyés par d'excellens exemples.

Nous pensons donc, Messieurs, qu'en accordant votre approbation à notre rapport, vous ferez une chose juste et utile à l'art musical autant qu'honorable pour M. Coche.

Signé à la minute : CHERUBINI.
PAER.
AUBER.
HALEVY.
CARAFA.
BERTON, rapporteur.

L'Académie adopte les conclusions de ce rapport.

Certifié conforme :

Le Secrétaire perpétuel,
QUATREMÈRE DE QUINCY.

EXTRACT TRANSLATED FROM COCHE'S PAMPHLET, ENTITLED "EXAMEN CRITIQUE DE LA FLÛTE ORDINAIRE COMPARÉE À LA FLÛTE DE BÔHM. PARIS, 1838.

The report of the Institute had come to sanction both Boehm's invention and the modifications which I had applied to it, when, just as I was about to publish the work which had been the cause of this report, I learnt that Boehm's title to the invention could be disputed. As a conscientious artist, I wished to decide in accordance with precise information, and to render justice to him who had really invented the new flute. I am well aware that, as far as other considerations are concerned, it made little difference whether the flute had been invented by this or that artist ; but as I came forward as

a propagator of the Boehm system, I was unwilling that any one should be able to raise objections to the statements made in my work. I therefore postponed its publication and wrote to M. Gordon, in Switzerland, to whom many artists attributed the invention of the flute called Boehm's. M. Gordon was not in a state to return me an answer. I received, however, a letter from his wife (see No. 1) which seems to attribute the invention of the new flute exclusively to M. Gordon (see at the end, Fig. 1).[1] On receiving this letter I thought it my duty to write to Boehm, and I made him understand the necessity of giving me explanations which would enable me to draw up my opinion of the case. Boehm replied (see No. 2) that the invention was really his own, and that his instrument, which was already finished in 1832, could not be compared to the attempts of M. Gordon, who was making experiments in Boehm's house in 1834.

Nevertheless, in a letter dated from Munich on the 15th of July, 1833 (see No. 3), Gordon speaks of the flute he had just had constructed by a skilful workman of Boehm. In fact, Boehm himself says that before this time Gordon had passed nine months at his house for the purpose of superintending the construction of his flutes. In the midst of all these assertions, I cannot do better than place before the public the evidence from which conclusions can be drawn. It is a duty I owe to myself to endeavour to ascertain the truth, let the public then decide on the validity of the claims of each of the two inventors.

A point which comes out as most evident is that in 1827 Boehm was not engaged in making flutes on the[2]

[1] The figure here referred to forms Fig. 7 in this work.

[2] There is a fallacy here resulting from the misleading use of the article "the." It is true that Gordon was the first to make a flute on *a* new system, viz. his own system, but not on *the* new system, viz. Boehm's system.

If Coche had confined himself to saying that Gordon had

new system, as Ivan Muller [3] asserts positively; Gordon, on the other hand, had already made them. The priority of the invention is therefore secured to him; and besides, he was the first to find the division in the column of air;[4] to make use of crescents, by means of which one can obtain the effect of several movements by one finger only; to have recourse to the practice of making an excavation to receive the lower lip with the view of destroying the disagreeable effect of the blowing.[5] Such are the general principles of the construction of the new flute, which Boehm has modified, chiefly by the application of the keys for F sharp and the D shake; by replacing by rings the crescents invented by Gordon,[6] and by imparting much more strength and simplicity to the mechanism, which, originally composed of cranks and iron wire, provided no security for execution.

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attempted, as early as 1827, to construct a flute on a system of open keys, and that, in so doing, he had anticipated Boehm, no objection could be taken to his statement. But still Boehm does not seem to have been indebted to Gordon for the idea of this system, for he appears to have been acquainted with it before he knew him (see note 6, p. 22).

[3] A clarionetist, born 1781, died 1854. In 1811 he invented the thirteen-keyed clarionet.

[4] Boehm had made a flute in which the column of air was properly divided before he made Gordon's acquaintance (see Fig. 4). Moreover, the same thing had been done in England more than a quarter of a century before Gordon commenced his experiments (see note, p. ~~22~~ 40).

[5] This practice has so long fallen into disuse that but few flute-players of the present day are aware that it was supposed, fifty years ago, that by scooping away a little of the wood, so as to form a hollow, where the lower lip rests against the head-joint, it was possible to prevent the production of the disagreeable hissing sound, sometimes heard when the flute is played.

[6] However much obscurity there may be regarding the origin of the ring-keys, there can be but little doubt that they were not a modification of the crescents as here maintained by Coche (p. 38).

CORRESPONDENCE.

No. 1.

SIR, LAUSANNE, *20th May*, 1838.

It is quite true that my husband, passionately fond of music, to which he devoted every moment he could possibly spare from his professional duties, and unable to reconcile himself to the limits and imperfections of the flute, endeavoured, during several years, to invent an instrument, in which great accuracy of intonation should be combined with a more extensive compass and easy execution. He succeeded at length in 1830—a year in which the Revolution of July deprived him of his profession, of his expectations, and consequently of his fortune. He thereupon conceived the idea, with a view of recovering it, of turning this new flute to account by playing on it in public in the principal towns of Europe, then, on taking out a patent, by establishing manufactories and introducing this beautiful instrument into the musical world.

He began by going to Munich in 1833, to be near to M. Boehm, whom he had known in Paris,[7] and one of whose workmen was the only person who could assist him in the construction of the flute which he had invented. I could not tell you at present, Sir, if M. Boehm owes to my husband the idea of the flute, which he has sent you, or if he has only perfected it after his, or if, perhaps, he has sent you my husband's. I could write to obtain this

[7] I have no hesitation in saying that Madame Gordon is in error here. It was not in Paris, but in London that Boehm had known her husband. Boehm speaks precisely on this point (see pp. 20, 83), and I know no valid reason for calling in question the accuracy of his statement. Fétis follows Madame Gordon into this mistake.

information, if you would advise me, to the workman with whom he made it, and would send you his answer. But what I know is this, that after having passed some months at Munich for constructing his flute, he then went to London to carry out his plans; but as he was very shy, without introductions, without a knowledge of the world and of the way to set to work to succeed in it, he saw his pecuniary resources diminish and come to an end before he had been able to make himself known; so that he returned hither to his family ill and disheartened. Afterwards there happened an accident to fill to the brim the cup of his troubles; this instrument, which had cost him so much pains and study, became cracked in consequence of another improvement, which he wished still to make on it. Though terribly cast down, he set to work to make another of the same kind; for he had acquired by his perseverance a skill far superior to that of the workmen who surrounded him. But the earnestness which he brought to bear on the work, and the difficulty of executing it without any assistance, added to the crosses of all sorts which his designs had brought upon him, have by degrees altered his intellectual faculties, before he was able to finish his work, and he has been obliged to break it off completely, and to keep at a distance every idea, which could bring it to his mind, in order to give his head the repose of which it stands in need; and it is for this reason, Sir, that I lay down my pen without having been able to mention to him that which forms the subject of my letter.

Perhaps M. Boehm, who must have been informed this winter by his workman of my husband's state, may have thought that, since my husband was suffering from a mental malady, he could, without showing a want of delicacy, appropriate to himself an invention, which, without him, would remain useless to the public. What makes me suppose this is the coincidence between

M. Boehm's invention and my husband's attack.[8] However, M. Drouet, of whom M. Gordon is an old pupil, and who has seen and admired his flute, will be able to tell you what he thinks, and at what period it was made. M. Tulou must also have seen it.

I add to this letter the drawing of this instrument, as well as its fingering, just as my husband designed it, and since Providence has permitted that you should interest yourself in this affair, and that a delicate sentiment has made you desire to be able to render justice to him to whom it belongs, be so kind, Sir, as to honour me with your advice, and tell me what steps I could take to maintain for my husband those rights, which, if it should please God to restore him to health, may be of use to him some day. I need not say, Sir, how entitled you will be to my gratitude, and to my highest esteem.

M. GORDON.

No. 2.

SIR, MUNICH, *June 2nd*, 1838.

I am very much obliged to you for your letter, dated the 25th of May, and I hasten to return you an answer; I know Mr. Gordon very well; he was formerly Captain in the Swiss Guards at Paris. I made his acquaintance in London six years ago,[9] and he had at that time a flute, which was very different in its construction from other flutes, but which was out of tune, and of little practical use.

[8] It is, of course, unnecessary to point out that this coincidence existed only in the imagination of the writer. Had she belonged to the responsible sex, it would have been more than reprehensible on her part to place on paper such a suspicion. As it is, a double disgrace attaches to Coche, who did not shrink from publishing in a lady's name, without comment or explanation, what he well knew to be an abominable calumny.

[9] Boehm made Gordon's acquaintance in 1831, seven, not six years before the time at which he was writing.

He had heard that I was in London, and, knowing that I was a manufacturer, he came to call upon me, and to consult me respecting his flutes. At that time I had already made in London the model of my new flute, and I showed him everything that I had done.

Mr. Gordon would not adopt my flute, because it was not of his own invention,[10] and he laboured so much to find a different construction, that his efforts almost turned his brain. In 1834 he wrote to me from Lausanne, saying that he admired very much the workmanship of my flutes, and requesting me to make one according to his ideas.[11] I consented, and he came to Munich, where I put one of my workmen under his directions.

According to my advice, he adopted for the most part the position of the holes of my flute, but he persisted in following out his own ideas as to the mechanism of the keys; and, after having laboured nine months with my workman, and after having constructed and tuned several flutes, he at last completed one, which resembled mine in some points. I last saw him in London in 1836. He was then in great difficulties, and he told me that he intended to give up his fruitless efforts, and play on my flute. Some time after, he wrote to me at Munich to send him one of my flutes for his own use. I wrote to him, stating on what terms I would let him have one, but I received no answer; and afterwards, one of his countrymen told me that he had quite given up playing on the flute, that he had thrown his instrument into the Lake of

[10] "I asked him," said Boehm to me, speaking of Gordon, "why he did not take *my* flute, and he said, 'because I wish to have a flute of my own.'"

[11] This letter, which was afterwards published by Boehm, was written in 1833, not 1834. There is no allusion in it to Gordon having admired the workmanship of Boehm's flutes; we may therefore conclude that Boehm did not refer to it, when writing to Coche, but trusted to his memory. This may account for the inaccuracy regarding its date.

Geneva, and was in bad health. Last year he wrote again to the workman in my employ who made his flute, wishing him to join him in establishing flute manufactories in Paris, London, Vienna, &c., and at the same time there came a letter from his family, stating that he was very ill and that they wished no answer to be sent to his letter.

I assure you, Sir, that I felt very much for Mr. Gordon, whom I esteemed on account of his character. It is unfortunate that this gentleman, who was held in high estimation as a brave officer of great talents and merit, should have lost his time and money in the vain desire to be the inventor of an instrument for which neither his knowledge of acoustics nor his skill in mechanics was sufficient, and that he should have incurred so much expense and experienced so much anxiety that it affected his mind as well as his worldly affairs. If you wish to have certificates that my flute was completed in 1832, and that Mr. Gordon was having his flutes made in my manufactory in 1834, I will send them to you immediately. In 1834, there was an article respecting my new flute in the *Gazette Musicale de Leipsig*, No. 5. In 1833 MM. Farrene, Camus, and Laurent, manufacturers of flutes (Palais Royal) who knew Mr. Gordon, were already acquainted with my new flute, and the reason that it was not then more generally known, was, that I was too much occupied during three years with ironworks in England, and also I played very little myself. But I shall now publish a history of my flute in the musical and political journals. At the same time accept, Sir, my friendly salutations,[12] &c. &c.

THEOBALD BOEHM.

First Flute of the Chapel Royal at Munich and instrument maker.

[12] It will be observed that, although Boehm does not assign any share of the invention to Gordon, but speaks disparagingly of his knowledge of mechanics and his scientific attainments, and seeks

No. 3.

SIR, MUNICH, *15th July*, 1833.

Having long known how obliging you are, I make bold to ask you to do me a service. It relates to the delivery to the undermentioned of some copies of the papers, which I direct to you from Munich, where I have just had made by a skilful workman an excellent instrument on my model. I shall start shortly for London, where my address is 22 *Newcastel* (sic) *Street, Strand.* Be so good as to send me a line thither on receiving the papers, which I have prepaid as far as I can. We will settle, later on, your expenses. You could leave your address with some of those mentioned below, so that, if any amateurs should come forward, you would be able to let them have mine in London.

For M. Pleyel, at the Music Warehouse, Boulevart des Italiens, 6 copies; for Paccini, idem, No. 11; M. Frey, No. 8 Place des Victoires; Schlesinger, No. 97 Rue Richelieu; M. Laurent, Flute Maker, 65 Palais Royal; M. Tulou, No. 27 Rue des Martirs; M. Drouet, No. 28 Rue de l'Arcade; M. Farrene, No. 21. Rue S. Marc; M. Camus, Rue Montmartre, opposite the Rue Montorgueil; M. Lemoine, No. 9 Rue de l'Echelle; Jeannet et Cotelle, 123 Rue St. Honoré; at the office of M. Fétis, editor of the 'Journal of Fine Arts,' No. 31 Rue S. Lazare.

With thanks, which pray accept in advance, and with my kind regards, and to your family as well,

Your faithful servant,

GORDON.

This letter is addressed to M. Mercier, 2, Rue St. Nicaise.

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to convey the impression that his flute, with the exception of the keys, was founded on his own (compare p. 65), yet this letter contains no passage in which Boehm denies categorically that he derived any ideas from Gordon, and I know of no such denial in any part of his works.

As Coche's pamphlet is very scarce, I append the original French of the extract from which the translation is made :—

"Le rapport de l'Institut était venu sanctionner et l'invention de Bôhm et les modifications que j'y avais apportées, lorsqu'au moment de publier le travail qui avait motivé ce rapport, j'appris que la qualité d'inventeur pouvait être contestée à Bôhm. En artiste consciencieux, je voulais fixer mon opinion d'après des renseignemens exacts et rendre justice à celui qui avait véritablement découvert la nouvelle flûte. Je sais bien qu'il importait fort peu d'ailleurs que la flûte eût été inventée par tel ou tel artiste ; mais moi, qui me donnais comme propagateur du système de Bôhm, je ne voulais point qu'on pût reclamer contre les assertions contenues dans mon travail ; j'ajournai donc la publication et j'écrivis à M. Gordon en Suisse, auquel l'opinion de plusieurs artistes attribuait l'invention de la flûte dite de Bôhm. M. Gordon étant hors d'état de me répondre, je reçus néanmoins de sa femme une lettre (*Voir* N. 1) qui semble attribuer exclusivement à M. Gordon[13] l'invention de la flûte nouvelle. A la reception de cette lettre, je crus devoir écrire à Bôhm, et je lui fis comprendre la nécessité de me donner les éclaircissemens d'après lesquels je pusse formuler mon opinion. Bôhm me répondit (*V.* N. 2) que l'invention était véritablement de lui, et qu'en 1832 son instrument déjà complet ne pouvait être comparé aux essais de M. Gordon qui en 1834 faisait fabriquer chez lui Bôhm. Cependant, par une lettre datée de Munich du 15 juillet 1833 (*V.* N. 3), Gordon parlait de la flûte qu'il venait de faire construire par un habile ouvrier de Bôhm. En effet, Bôhm dit lui-même qu'avant cette époque Gordon avait passé neuf mois chez lui pour surveiller la construction de ses flûtes. Au

[13] Voir à la fin, Fig. 1.

milieu de toutes ces assertions, je ne puis mieux faire que de mettre sous les yeux du public les pièces de conviction, au moyen desquelles il pourra tirer des conséquences. Je me devais à moi-même de chercher la vérité ; qu'on juge donc la validité des prétentions de l'un ou de l'autre inventeur.

"Ce qui ressort de plus évident, c'est qu'en 1827 Bôhm ne s'occupait pas de la fabrication des flûtes d'après le nouveau système, Iwan Müller l'affirme positivement ; Gordon, au contraire, en avait déjà construit ; l'antériorité de l'invention lui est donc acquise ; et d'ailleurs, il fut le premier à trouver la division de la colonne d'air ; à faire usage de croissans, au moyen desquels on peut obtenir le résultat de plusieurs mouvemens par un seul doigt ; à pratiquer une excavation pour recevoir la lèvre inférieure dans le but de détruire l'effet désagréable produit par le souffle. Telles sont les bases générales de la construction de la nouvelle flûte que Bôhm a modifiée, notamment par l'application des clés de *fa* dièse et du trille de *ré* en remplaçant par des anneaux les croissans inventés par Gordon, et en donnant beaucoup plus de solidité et de simplicité au mécanisme qui, dans le principe, se composait de crochets et de fil d'acier qui n'offraient point de sécurité pour l'exécution."

No. 1.

"MONSIEUR, LAUSANNE, *le* 20 *mai*, 1838.

"Il est très-vrai que mon mari, passionné de la musique, à laquelle il a consacré tous les momens que son état ne réclamait pas impérieusement, et ne pouvant prendre son parti des bornes et de l'imperfection de la flûte, a cherché, pendant plusieurs années, à en inventer une qui réunît à une grande justesse de son une plus grande étendue et une exécution facile. Il y réussit

enfin en 1830, époque à laquelle la révolution de juillet l'a privé de sa vocation, de ses espérances, et par conséquent de sa fortune. Il eut alors l'idée de tirer parti de cette nouvelle flûte, pour la rétablir, en se faisant entendre dans les principales villes de l'Europe, puis en obtenant un brevet d'invention, établissant des fabriques et introduisant ce bel instrument dans le monde musical.

"Il commença par aller à Munich en 1833, auprès de M. Bôhm, qu'il avait connu à Paris, et dont un des ouvriers pouvait seul l'aider à la confection de la flûte qu'il avait inventée. Je ne pourrais vous dire à présent, Monsieur, si c'est à mon mari que M. Bôhm doit l'idée de la flûte qu'il vous a envoyée, ou s'il l'a seulement perfectionnée d'après la sienne, ou si, peut-être, il vous a envoyé celle de mon mari ; je pourrais écrire pour le savoir, si vous me le conseillez, à l'ouvrier avec lequel il l'a faite, et je vous enverrais sa réponse. Mais ce que je sais, c'est qu'après avoir passé quelques mois à Munich pour la facture de sa flute, il est allé ensuite à Londres pour l'accomplissement de ses projets ; mais comme il était fort timide, sans recommandation, sans connaissance du monde et de la manière de s'y prendre pour y réussir, il y a vu diminuer et finir ses ressources pécuniaires avant d'avoir pu se faire connaître ; en sorte qu'il est revenu ici, dans sa famille, malade et découragé. Puis un accident est venu compléter tous les chagrins qu'il avait essuyés : cet instrument, qui lui avait coûté tant de peines et de veilles, s'est fendu par suite d'un perfectionnement qu'il a voulu encore y faire. Quoique désolé, il s'est remis à l'ouvrage pour en faire un autre ; car il avait acquis par sa persévérance une habileté bien supérieure aux ouvriers qui l'entouraient. Mais l'ardeur qu'il a mise à ce travail, et la difficulté de l'exécuter sans aucun secours, jointes aux contradictions de tout genre que ses projets lui avaient suscitées, ont peu à peu altéré ses facultés intellectuelles avant qu'il ait pu achever son ouvrage, et il a dû l'inter-

rompre entièrement et éloigner toute idée qui pût s'y rapporter, afin de laisser reprendre à sa tête le calme dont elle a besoin ; et c'est ce qui fait, Monsieur, que je prends la plume à sa place, sans avoir pu lui parler de ce qui fait le sujet de ma lettre.

"Peut-être M. Bôhm, qui doit avoir appris cet hiver par son ouvrier l'état de mon mari, aura-t-il cru que, puisque mon mari était atteint d'une maladie mentale, il pouvait, sans manquer à la délicatesse, s'approprier une invention qui, sans lui, restait inutile au public. Ce qui me le ferait supposer, c'est la coïncidence de l'invention de M. Bôhm avec la maladie de mon mari. Du reste, M. Drouet, dont M. Gordon est un ancien élève, et qui a vu et admiré sa flûte, pourra vous dire ce qu'il en pense, et à quelle époque elle a été faite. M. Tulou doit l'avoir vue aussi.

"Je joins à cette lettre le dessin de cet instrument ainsi que sa tablature, telle que mon mari l'avait confectionnée ; et puisque la Providence a permis que vous vous intéressiez à cette affaire, et qu'un sentiment délicat vous a fait désirer de pouvoir faire rendre justice à celui à qui elle appartient, veuillez m'honorer de vos conseils, Monsieur, et me dire quelles démarches je pourrais avoir à faire pour conserver à mon mari des droits qui, si Dieu permet sa guérison, pourraient lui être utiles un jour. Je n'ai pas besoin de vous dire, Monsieur, tous les titres que vous acquerrez à ma reconnaissance, ainsi que toute ma considération.

"M. GORDON."

No. 2.

"MONSIEUR, MUNICH, *le 2 juin*, 1838.

"Je vous suis bien obligé pour votre lettre du 25 mai, et je m'empresse de vous donner de suite une réponse. Je connais très-bien M. Gordon, ci-devant capitaine dans

la garde suisse à Paris. Je fis sa connaissance à Londres il y a six ans, et il avait dans ce tems une flûte d'une construction différente des autres flûtes, mais qui était fausse et peu praticable. Il avait pris connaissance de mon séjour à Londres, et vint me visiter pour me consulter sur des flûtes, parce qu'il savait que j'en fabriquais moi-même. Dans ce tems, j'avais déjà fait à Londres le modèle de ma flûte nouvelle, et je lui montrai tout ce que j'avais fait.

"M. Gordon ne voulut pas prendre ma flûte parce qu'elle n'était pas de son invention, et il travailla tant pour trouver une construction différente, que ses efforts lui tournèrent presque la tête. En 1834, il m'écrivit de Lausanne qu'il admirait beaucoup l'ouvrage de mes flûtes, et me demanda si je ne voudrais pas lui faire une flûte d'après ses idées; je consentis, et il vint à Munich, où je mis un de mes ouvriers à sa disposition.

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famille, l'informant qu'il était bien malade, et témoignant le désir qu'on ne lui fît point de réponse.

"Je vous assure, Monsieur, que j'eus beaucoup de compassion pour M. Gordon, que j'estimais à cause de son caractère, et il est bien dommage que cet homme, qui était estimé de beaucoup comme un brave officier, possédant de grands talens et de beaucoup de mérite, ait perdu son tems et son argent en ayant la folie de vouloir être l'inventeur d'une chose pour laquelle ni sa connaissance dans l'acoustique ni son habileté dans le mécanisme n'étaient suffisantes, et qui lui donnait tant de peine que les efforts dérangèrent sa tête et sa fortune. Si vous désirez avoir des certificats que ma flûte était déjà complète en 1832 et que M. Gordon faisait faire ses flûtes dans mon établissement à Munich en 1834, je vous les ferai parvenir tout de suite. En 1834 il y avait un article concernant ma nouvelle flûte dans la *Gazette Musicale de Leipzig*, No. 5. En 1833, MM. Farrene, Camus et Laurent, facteurs de flûtes (Palais-Royal), qui connaissent M. Gordon, connaissaient déjà ma nouvelle flûte, et la cause qu'elle n'était pas encore connue plus généralement, était parce que j'étais trop occupé pendant trois ans avec les fabrications de fer en Angleterre, et que je jouais très-peu moi-même ; mais à présent je ferai mettre dans les gazettes musicales et dans les journaux politiques une histoire détaillée de ma flûte.

"En même tems recevez, Monsieur, mes salutations amicales et ma plus haute considération.

"THEOBALD BOEHM."

No. 3.

"MONSIEUR, MUNICH, 15 *juillet*, 1833.

"Connaissant depuis long-tems votre obligeance, je ne crains pas de vous demander un service. Il s'agit de

faire remettre aux ci-après nommés quelques exemplaires des imprimés que je vous adresse de Munich, où je viens de faire exécuter par un habile ouvrier un instrument excellent d'après mon modèle. Je partirai prochainement pour Londres, où mon adresse est *New-Castel street Strand* 22. Veuillez m'y adresser un mot sur la réception des imprimés, que j'affranchis aussi loin que je puis. Nous compterons plus tard vos déboursés. Vous pourriez laisser votre adresse chez quelques-uns des ci-dessous nommés pour que, s'il se présente des amateurs, vous puissiez leur indiquer la mienne à Londres.

"Pour M. Pleyel, au magasin de musique, boulevart des Italiens, 6 exemplaires; pour Paccini, idem, No. 11; M. Frey, place des Victoires, No. 8; Schlesinger, rue Richelieu, No. 97; M. Laurent, facteur de flûtes, Palais-Royal, 65; M. Tulou, rue des Martirs, No. 27; M. Drouet, rue de l'Arcade, No. 28; M. Farrene, rue S.-Marc, No. 21; M. Camus, rue Montmartre, en face la rue Montorgueil; M. Lemoine, rue de l'Echelle, No. 9; Jeannet et Cotelle, rue S.-Honoré, No. 123; au bureau de M. Fétis, rédacteur du journal des Beaux-Arts, rue S.-Lazare, No. 31.

"Recevez d'avance mes remercîmens et mes complimens très-affectueux, ainsi que votre famille.

"Votre dévoué serviteur,

"GORDON."

Cette lettre est addressée à M. Mercier, rue St. Nicaise, No. 2.

EXTRACTS FROM BOEHM'S PAMPHLET, 'DE LA FABRICATION ET DES DERNIERS PERFECTIONNEMENTS DES FLÛTES.'

Dans cette dernière ville, j'avais été frappé du volume de son de Nicholson, alors dans toute la vigueur de son talent. Cette qualité resultait de la largeur extraordinaire des trous de sa flûte, mais il fallait son habileté merveilleuse et son excellent embouchure pour masquer le défaut de justesse et l'inégalité de son, resultant d'une disposition de trous incorrecte et condamnée par les principes élémentaires de l'acoustique. Je vis aussi à Londres, à cette époque, un amateur, M. Gordon, qui avait déjà fait de nombreux essais de perfectionnement, d'abord à Paris, puis à Londres.

Le trou de *mi* de sa flûte était percé plus bas et plus large que d'usage, et pour éviter le levier du *fa*, il avait adopté une clef à anneau ; il avait en outre fait faire une quantité de clefs et de leviers ingénieusement imaginés, mais trop compliqués pour offrir jamais un grand avantage à sa flûte, construite du reste en dehors des bases de l'acoustique ; et destinée, par conséquent, demeurer imparfaite. Tout cela me confirma dans cette conviction, fruit de mes longues recherches, qu'on n'obtiendrait aucun perfectionnement complet sans reformer le système de doigter.

Je résolus donc de consacrer mes veilles à la construction d'une flûte entièrement nouvelle, qui réunît la justesse, l'égalité et la puissance de son, et sur laquelle toute musique, écrite dans son étendue, pût s'exécuter. De

retour à Munich, je me mis à l'œuvre. Après un mûr examen et de nombreuses expériences de perces et de mécanismes, je me fixai au système des clefs à anneaux comme répondant le mieux à toutes les exigences, système que j'avais déjà médité dès avant 1831.

. . . . . .

Malgré ce succès, dont je me réjouis, je confesse que je n'ai jamais fait grand cas de mon invention, ni sous le rapport du mérite, ni sous le rapport du produit. Je me contentais de l'approbation de quelques connaisseurs impartiaux ; je n'avais pas même songé à prendre de brevet ; mais je sais qu'on a cherché à me contester ma découverte, pour en parer un homme aussi honnête que modeste, et qui ne peut plus protester . . . , car il est mort. Je crois donc devoir donner quelques explications sur mes rapports avec M. Gordon.

Dès 1832, ma nouvelle flûte était achevée ; je l'avais fait entendre maintes fois, j'en avais livré au public une grande quantité, quand je reçus de M. Gordon la lettre suivante, dont l'original est entre mes mains :—

"LAUSANNE, 15 *février*, 1833.

"MON CHER MONSIEUR,

"Je suis depuis quinze jours de retour chez moi, à Lausanne, après un séjour assez long à Paris, où je suis venu de Londres peu après vous y avoir vu, lorsque vous en êtes parti pour Munich. Je n'ai pas perdu mon temps, et j'ai travaillé avec persévérance à une flûte nouvelle que j'ai faite moi-même aussi bien que j'ai pu et que je viens de terminer.

"Je ne vous ai point oublié, et j'ai toujours attendu que vous m'enverriez une flûte perfectionnée que vous vous proposiez de faire à votre retour en Allemagne. Selon votre offre à Londres, je veux vous envoyer ma flûte, en vous priant de m'en faire une belle sur ce modèle, vu que je possède entièrement le doigter pour la jouer ;

je vous enverrai en même temps la tablature pour le doigter.

"Je n'ai pas voulu vous envoyer ma flûte avant d'avoir reçu de vos nouvelles. Veuillez donc m'écrire à l'adresse ci-après :

À M. Gordon, à Lausanne, Suisse,

et me dire la manière que vous croyez la plus sûre de vous la faire parvenir sans accident, et si vous pourriez m'en faire une semblable et vous en occuper le plus tôt possible. Dans l'espérance que ma lettre vous trouvera à Munich, je vous l'envoie à l'adresse que vous m'aviez donnée.

"Acceptez l'assurance, etc.,

"GORDON."

Sur ma réponse, M. Gordon vint quelques mois après à Munich, et il reconnut les imperfections de son instrument. Il rejeta donc complètement son système pour en essayer un nouveau. Ce qu'il cherchait, c'était un mécanisme simplifié qui lui permît de conserver plusieurs des doigters ordinaires.

J'avais mis à sa disposition mes ateliers et mes ouvriers, et c'est au bout d'une année, après avoir entièrement gâté deux flûtes par ses essais de modifications continuelles, qu'il termina la flûte représentée par la figure 1,[14] avec laquelle il quitta encore Munich.

Il appelait sa flûte, bien à tort, flûte *diatonique*, car il n'y a que l'ancienne flûte à 6 trous qui soit telle. Toutes celles faites depuis, et pourvues de clefs, sont chromatiques.

Il fit faire, pour le doigter de sa flûte, une lithographie qu'il publia en 1834.

Dans cette tablature, que je reçus de lui-même, il dit, entre autres choses relatives à la description de sa flûte :

[14] See Fig. 5.

" La suppression des deux clefs de *fa* naturel, et leur remplacement par une clef de *fa* dièse est une idée dont l'application offre de grands avantages. L'idée de cette clef de *fa* dièse, *communiquée* par *M. Th. Boehm, de Munich*, a été, *avec son agrément*, adoptée pour *la présente flûte* dont elle complète les moyens d'exécution."

Du reste, personne, que je sache, n'a ni imité ni joué la flûte de Gordon. Plus tard, quand je le rencontrai à Londres, il me manifesta le désir d'avoir une de mes flûtes, la sienne ne le contentant nullement.

J'ai entre mes mains la preuve de ces faits. Comment donc, ma flûte, antérieure à celle de Gordon, pourrait-elle lui avoir emprunté quelque chose, ainsi qu'on l'a prétendu ?

M. Gordon a fait usage des parties essentielles de mon instrument pour construire le sien ; mais il l'a toujours loyalement reconnu.

La preuve la moins douteuse de l'authenticité de mon invention résultera de l'exposé des motifs et de l'explication des principes d'acoustique et de mécanique par moi mis en usage, car celui-là seul est capable d'une œuvre rationnelle qui peut rendre compte du pourquoi et du comment dans l'exécution de chaque détail.

OBITUARY ARTICLE ON BOEHM FROM THE LONDON *FIGARO* OF DEC. 28TH, 1881.

I recently announced the death, at his birthplace, Munich, at the advanced age of 88, of Theobald Boehm, celebrated as the alleged inventor of the Boehm method of fingering for the flute. This gentleman must not be confounded with Joseph Boehm, once a celebrated violinist, who died in 1876. Joseph Boehm is now well-nigh forgotten, and his name is only recollected by a few as that of the teacher of two of the most celebrated violinists of modern times—Ernst and Joachim. Forty-three years ago [15] Theobald Boehm came out in London as a flautist. He was considered an excellent performer; and it was here that he made an acquaintanceship which was destined to render his name famous. It is an old tale and, it is believed, a true one, that the Boehm method of fingering was really the invention of Captain W. Gordon (an Anglo-Swiss), Captain of the Swiss Guards in the Paris garrison, and the pupil for the flute of Drouet. Gordon conceived his idea of flute improvements as far back as 1826, and in the following year flutes—imperfectly showing his invention, it is true—were made to his designs in Paris. The Revolution of 1830 deprived him of his position, and Captain Gordon believed he would be able to support his wife and family

[15] Boehm came out in London as a flautist in 1831, or fifty years before this article was written.

by his new flute. In an unlucky day he showed it to Boehm, then on a visit to London, and Boehm, finding Gordon poor,[16] at once "annexed" the idea for himself. Gordon heard that Boehm had begun the manufacture of flutes at Munich, and he followed him to that town. He arrived there in 1833, and spent six months in perfecting two instruments. Satisfied that his invention had reached perfection, he printed a prospectus of the new instrument, and published it in Great Britain, France, and Germany. He expected that orders for the new flute would pour in upon him. But the world is slow to accept improvements, and the unhappy Gordon retired heart-broken with his family to Lausanne. Maddened at seeing the results of his own talent attributed to Boehm, his brain became affected, and in 1836 it was necessary to confine him in a lunatic asylum.[17] A fierce war arose in 1838 on the question of the invention of the flute, Gordon's claims being stoutly championed from Paris, while Boehm replied from Munich. Although, therefore, the invention of the so-called "Boehm method" cannot in justice be attributed to the Bavarian flautist, there is no doubt the method was perfected by Boehm. In 1849 he introduced a genuine improvement in the tube of the flute, giving it a conical instead of a cylindrical head. At the Great Exhibition of 1851 the following report of the jury was published, signed by the late Sir Henry Bishop, the reporter :—

"M. Boehm's inventions may be briefly described as follows :—First, he brought the acoustical proportions of tubes and the finger-holes of wind instruments into

[16] This, I believe, is the first time that Boehm's alleged annexational proclivities were said to be stimulated into activity by Gordon's poverty. Gordon's insanity had long before (p. 82) been brought forward as the supposed exciting cause.

[17] A very different account of the origin of his insanity is given at p. 30, *q. v.*

correct numbers and measurement, by which means flutes, oboes, clarionets, bassoons, &c., can be theoretically constructed. Secondly, he has invented mechanism for the keys, which gives facility and precision to the execution, and by which the former difficulty of reaching or stopping the holes at great distances or of large sizes is now surmounted. As by these means the holes may be made correct in size and position, M. Boehm has acquired not only a perfection in tone and tuning never before attained, but also a great facility in playing in those keys which were hitherto difficult and defective in sonorousness or intonation."

At the Paris Exhibition of 1855 M. Fétis, the reporter of the jury, expressed himself in similar terms. The French writer was, however, more honest than the English reporter in giving our own Captain Gordon his share of the credit. Mr. William Pole, the reporter at the London Exhibition of 1862, alluded to Boehm as follows:—

"Boehm extended brass and other metals as materials for flutes, clarionets, and hautboys, at the same time that he introduced an entirely new and scientific system of construction, which has done more than anything else to lift this class of instruments to their present degree of perfection both of intonation and of timbre.

"Boehm, of Munich, the celebrated regenerator of flutes, clarionets, hautboys, &c., was appointed one of the jurors of this class, but for some reason he has not visited London. He has, however, sent for exhibition a geometrical diagram, with explanations, by which makers of tubular instruments can, with the greatest readiness and accuracy, construct their instruments according to any of the recognised pitches. Having been applied to by many factors for new models, M. Boehm desired to give his diagram and explanation the greatest publicity and usefulness by sending them to this exhibition."

Boehm wrote several compositions for the flute, with, however, very little success. In 1847, Messrs. Schott of Mayence published from his pen a pamphlet "on the construction of the flute and its new improvements."

LETTER FROM MR. W. S. BROADWOOD IN THE LONDON *FIGARO* OF JAN. 1ST, 1882.

I am glad to publish the following interesting letter from Mr. Walter Broadwood in defence of the late Theobald Böhm. The letter will speak for itself; and I will merely add that the question which Mr. Walter Broadwood thinks "not very material," whether Böhm did, or did not, originally annex or borrow his ideas or first notions from Captain Gordon, really formed the text of my remarks. Nobody doubts the ability with which Böhm subsequently developed those ideas, or his scientific or mechanical skill. The question of Gordon's claims was taken up by the late M. Fétis, and even more strongly in a pamphlet[18] on Böhm's invention printed forty-three years ago, soon after Böhm wrote his letters[19] of defence. Within the last week or two, those claims have been again advanced by the French and Belgian critics. I can, of course, only speak second-hand; and I have great pleasure in giving the *parole* instead to Mr. Walter Broadwood, who not only knew Böhm well, but who has made a special study of everything connected with the flute :—

"SIR,

"My attention has been called to an article in your journal, in which the writer brings charges against the late Theobald Böhm, of Munich, which are, as I think, both inaccurate and misleading.

[18] That by Coche.

[19] There is only one letter of defence, that given at p. 83.

"Your correspondent seems to consider that the main feature in Böhm's improvement of flutes was a system of fingering generally (he says erroneously) attributed to him, but in reality 'annexed' from one Captain Gordon. This it was, says your correspondent, which made Böhm's name famous. Gordon, we are told, invented and perfected this fingering; and after vainly advertising it throughout Great Britain, France, and Germany, he died of a broken heart, maddened by his failure to sell his invention, and by Böhm's 'annexation' of it. We are not told why what in the one case failed so signally, succeeded in the other so completely.

"In justice to Theobald Böhm, whom I knew very well for nearly forty years, I venture to suggest an explanation.

"He was a man of very considerable scientific, as well as technical, attainments. Originally a gold-worker, he subsequently became an inspector of mines, besides being for many years first flute in the principal orchestra in Munich. Whether he did, or did not, borrow ('annex,' if your correspondent prefers that term) the first notions of what Sir H. Bishop in his 1851 Exhibition report calls a system 'for reaching or stopping the flute-holes at great distances,' is not very material. Böhm always claimed the invention of the fingering known by his name; and I am not aware that it has ever been proved that Gordon's fingering was identical with it. The question which your correspondent begs, and on which he founds very serious charges, has, as he admits, been very 'fiercely debated,' but not conclusively settled. Be that as it may, Böhm soon perceived that the really essential points to be determined, with a view to the improvement of his instrument, were :—

"1. The shape and proportion of the tube, more particularly of that part known as 'the head,' where sound is generated.

"2. The exact position and proportion of the *embouchure* and finger-holes.

"In order to solve these problems, Böhm set himself to study acoustics, under the well-known Professor Schafhäutl, and after several years' labour produced, as a result, (1) 'a cylindrical tube with conical head'; (2) 'a geometrical diagram' (I now quote from Mr. Pole's report, 1862) 'with explanations by which makers of tubular instruments can with the greatest accuracy construct their instruments according to any of the recognised pitches.'

"It is upon these calculations, and upon their practical application, that Böhm's fame rests. It is no exaggeration to say that their publication produced a revolution in the manufacture of wind instruments. So little did the merit of Böhm's invention depend on any one system of fingering, that it was applicable not to flutes only, but also to oboes, clarionets, and bassoons, which are fingered quite differently. At the Exhibition (1851) competent and impartial musical judges pronounced it to be 'an entirely new and scientific system of construction, which has done more than anything else to lift this class of instruments to their present degree of perfection, both of intonation and of timbre.'

"If Böhm, originally like Captain Gordon, a poor man, had, like him, relied solely on a novel system of fingering, he would, probably, have been unsuccessful. In our days nearly every flautist has his own pet system of fingering, of which he proclaims the superiority, and which at all events suits *him* best. Several of these have been adapted to Böhm's tubes, with more or less success.

"That Böhm did not 'annex' his scientific knowledge may easily be proved. His letters, of which I have still a considerable number, prove it conclusively. The head of the Pulteney Street firm, whose intimate practical

knowledge of everything connected with the manufacture of pianofortes will be contested by no maker, whether English, French, or German, has repeatedly and ungrudgingly acknowledged the assistance afforded him years ago by Böhm when calculating what is termed the scale of grand pianofortes. He told me that he found Böhm very well versed in the acoustical bearings of that subject.

"But, to quote your correspondent's words, 'it is an old tale,' that of disputed inventions. A crude idea occurs to one man; it is developed and carried out, perhaps, by another. The former may have had neither the knowledge nor the perseverance necessary to mature his notion into practical utility. Yet he eventually claims, or his friends claim for him, all the merit of the invention.

"The French point triumphantly to Papin, the inventor of steamboats, as they assert, in Louis XV.'s time. My friend Mr. Hipkins, in his very able and interesting paper (see Grove's 'Musical Dictionary'), shows with more probability that Cristofori invented pianofortes. For the sake of argument, let us associate with them Gordon as the alleged inventor of the Böhm fingering: originator, if I rightly understood your correspondent, of the most material modern flute improvement.

"What would any of these, in their very different degrees of importance, say to their bantlings now full grown? Would they even recognise them? And what are *we* to say to those—if such indeed there be—who would claim for the putative progenitors all the merit?

"I am, Sir,

"Very obediently yours,

"WALTER STEWART BROADWOOD.

"CABALVA, RADNORSHIRE,
Jan. 1882."

ARTICLE BY DR. SCHAFHÄUTL FROM THE *MUSICAL WORLD* OF FEB. 18, 1882.

To the Editor of the 'Musical World.'

SIR,

The German manuscript of the accompanying paper, with a translation by himself, which I have since re-cast, was sent me by Mr. J. P. Triggs, flutist, of Glasgow. He tells me that he received the manuscript, corrected and signed in Dr. Schafhäutl's handwriting, from Mr. Schmidt, the publisher, of Heilbronn. I do not know whether it has been published in Germany, but I believe that it contains matter likely to interest English flute-players, and settles authoritatively the much-debated question as to the invention of the Böhm flute.

I am, Sir,
Very faithfully yours,
W. S. BROADWOOD.

CABALVA, RADNORSHIRE,
Feb. 13th, 1882.

THEOBALD BÖHM, AND THE FLUTE CALLED AFTER HIM.

It seems that the old dispute as to who was the real inventor of the "Böhm Flute" has again cropped up. It originated in Paris. The celebrated flutist, V. J. B. Coche, who was one of the first to play the Böhm flute, who contributed more than any one to bring it into use in

France, and who explained its merits in a pamphlet of his own composition (Paris, 1839), writes to Böhm, May 25, 1838: "On dit dans le monde artiste, que la flûte qui porte votre nom a été découverte par un nommé Gordon, ancien élève de Drouet."

The Gordon in question was a Swiss, who had served as an officer in the Gardes du Corps of Charles X., and had been pensioned after that king's abdication. He heard Böhm play upon his ring-keyed flute at a concert in London (1831); made Böhm's acquaintance; and conceived the idea of himself making a new flute that should be free from the defects of the old flute.[20] We shall become better acquainted with this "new flute." Gordon worked at it in Paris indefatigably with his own hands, and showed it to his teacher, Drouet. In a letter dated Feb. 15, 1833, he writes to Böhm: "J'ai vu Drouet à Paris; mais il récule devant un changement dans le doigté. Tulou en est là aussi."[21]

That Drouet and Tulou should have remembered Gordon when Böhm came forward with his own flute is easily to be accounted for; but that they should distinguish what was the fundamental principle on which the flutes of Gordon and of Böhm were constructed is

[20] The instrument on which Boehm played in his public performances, during his visit to London in 1831, was, as he states in his pamphlet, not a ring-keyed, but an improved old flute. He certainly showed Gordon a flute, on which there was a ring-key, and Gordon appears to have conceived the idea of making an instrument which should be an improvement on that which Boehm showed him (see p. 65).

It is to this, I presume, that Dr. Schafhäutl here alludes, for Gordon had conceived the idea of making a perfected flute long before he knew Boehm, and had been engaged in endeavouring to carry it out for four or five years, and, when he made Boehm's acquaintance, he showed him the result of his experiments in the shape of an ingenious instrument of novel construction.

[21] This passage does not appear in this letter as published by Boehm (p. 95). It may, of course, have formed a postscript to it.

more than could be expected of most artists; besides which they were reluctant to acknowledge that the new was more and more superseding the old flute; for Coche had already won over all musicians by his performances on the new Böhm flute.

I have frequently written concerning its origin; for instance, in the Official Reports of the London Industrial Exhibition, 1851 (Berlin, 1852, pages 882–884); again, in the Report of the Jurors' Committee, Munich Industrial Exhibition, 1854 (Munich, 1855, pages 444–446); and finally, in greater detail, in the 'Algemeine Musikalische Zeitung,' Leipsic, 1879, No. 39, pages 643–646.

Now that Gordon and Böhm are both dead, the former long since, the latter only towards the end of last year (November 25), I feel myself doubly compelled to make it clear to the musical public that Theobald Böhm is indeed the inventor of the flute which bears his name.

The eminent flutist, Theobald Böhm, was gifted not only with musical talent, but possessed also a genius for mechanism. After his appointment to the Royal Bavarian Orchestra in 1816, he made several cleverly designed flutes, with a special arrangement of key mechanism, for himself and for his master, Rapelle, also a member of the Royal Orchestra; and, finally, in the year 1828, he set up a flute manufactory of his own in Munich. From this period dates the gradual adoption in England and France of the excellent system of key mechanism, designed and made by Böhm himself. The great success which Böhm achieved as a flutist in Munich and in Switzerland induced him at length to visit Paris and London, where the artistic refinement of his style, the fluency and certainty of his execution commanded general admiration. In London the extraordinarily large tone of the flute-player Nicholson, at that time so celebrated in England, surprised Böhm, who hastened to make his acquaintance, and soon found that the secret of the power of the

Nicholson flute lay in the unusual size of the holes. But even so, the capabilities of the instrument were very limited, for, except that of F, no scale was quite in tune, The scales on the Böhm flute were all in better tune than those upon the Nicholson flute, as at that time manufactured by the English makers. Böhm had long been thinking of making a flute which should combine fulness of tone with accuracy of intonation; but he foresaw that this could not be accomplished without a change of fingering, and he knew how difficult it would be to induce musicians, who had practised one system all their lives, to take to another. During this visit to London, however, he finally resolved to carry out his long cherished purpose.

In December of the year 1832, his new flute with its new scale was finished. He soon mastered the new fingering, and in the succeeding year, 1833, played it in Paris, and also in London, with great success.

Savart, the professor of acoustics, at first received Böhm very coldly, and declared that to play the scale on the flute in tune in all keys was impossible, but when he heard Böhm do this he was so astonished that he himself introduced Böhm to the Academy.

In London Böhm created quite as great a sensation as in Paris. He particularly impressed Gordon, a retired colonel of the Gardes du Corps of Charles X. Gordon, who was a pupil of Drouet, and an enthusiastic flute-player, at once comprehended the advantages of the Böhm flute, renewed his acquaintance with Böhm, and was initiated into his system.[22] He induced Böhm to

[22] Dr. Schafhäutl does not appear to have been furnished with correct information respecting Gordon's movements. He is evidently not aware that, when Gordon visited London in 1833, he came from Munich, bringing with him the flute made there in Boehm's workshop, and that the object of his journey to England was to bring it out.

We must either believe this, or else reject the evidence furnished by the letters of Gordon and his wife (pp. 81–86).

have a flute tube made for him at Munich by his best workman, but without keys; for he believed that the Böhm mechanism could be simplified so as to require eight keys only. To this notion he clung till the end of his days; undeterred by constant failure, or by Böhm's warning that to obtain power, equality, and freedom of tone, together with fluency of execution and accuracy of intonation, with a flute having thirteen sound holes and only eight keys, was an impossibility. This notion of Gordon's had already become a sort of monomania. He clung to it till the end of his life—a very sad end, as we are told.

Gordon left London "peu de temps après votre départ pour Munich," as he writes in a letter of the 15th February, 1833.[23] He was then working, as we have seen, at a flute, with the thirteen holes of the Böhm system, but with only eight keys, which, as he wrote, he himself had made. This flute was barely playable in slow movements. In rapid passages, the very unequal tone frequently missed altogether. Gordon, however, ascribed these ever recurring difficulties of execution to bad workmanship; so that he looked upon the flutes he had made thus far as mere models.

In a letter from Lausanne, dated February, 1833, which lies before me at this moment, he requests Böhm to have a flute made by one of his very best workmen on his (Gordon's) model. Böhm answered that it would be better that Gordon should come to Munich. He followed

[23] Gordon is here referring to his departure from London after his visit in 1831, not after that in 1833. It is impossible that he can refer to that of 1833, because, when the letter, from which the extract is taken, was written, the visit of 1833 had not yet been paid. Gordon passed the January of 1833 in Paris, whence he went to Lausanne, as he states in this letter, arriving there about the first of February, and on the fifteenth of the month he wrote the letter (see p. 26).

this advice, and arrived in Munich, July, 1833,[24] where he remained till March, 1834; Böhm placing at his disposition one of his most skilful workmen, but being himself away in London.

Model after model was made and rejected one after another. I myself at first witnessed these unsuccessful attempts. At length a well-made flute upon Gordon's model was finished, and he at once brought his invention before the public. In 1834 Gordon advertised his new flute in Paris, under the name of "La Flûte Diatonique," and brought out a lithographed "Table of Fingering" for it.

In the introduction appended to his Table of Fingering for the "flûte diatonique, fabriquée dans les ateliers de Böhm," he says:

"La suppression des deux clefs de Fa dièze, [sic] est une idée dont l'application offre de grands avantages. *L'idée de cette clef de Fa dièze, communiquée par M. Böhm de Munich, a été avec son agrément adoptée pour la présente Flûte,* dont elle complète les moyens d'exécution." This diatonic flute had, of course, the thirteen holes of the Böhm system; five of which remained open for the fingers (E, F, F sharp, B, and C sharp).

Gordon's eight keys intended for the other eight holes were connected with each other by contrivances of all sorts—a very puzzle of levers. Above the D sharp hole were the ends of three keys, close together. Five keys had ends shaped like hackers (like the crescent of the moon five days before new moon), and these were for the shakes.[25]

[24] Dr. Schafhäutl is here at variance with Gordon, who in his letter to M. Mercier, dated July 15th, 1833, states that he was about, not to arrive at, but to leave Munich for London, his new flute being already finished (p. 86).

[25] The five holes mentioned as remaining open for the fingers, are seen in Fig. 5; the five crescents, and the ends of three keys close together above the D sharp hole, appear in Fig. 7.

Flute-players will, of course, understand that the crescents were

They were placed in the shape of a sickle round the holes, so that when one key was pressed down it closed two adjoining holes. Gordon worked on with Böhm's best workman (Böhm himself being again away) with great perseverance, but none of his diatonic flutes satisfied him. At length despairing, he went back to Switzerland, and we have no reliable account of what became of him and his flute. It was reported that he threw it into the Lake of Geneva, and died in a mad-house. His own fixed idea appears to have completely overmastered the intellect of that gallant and amiable gentleman.

In that same year (1833) Böhm went again to London, and created so great a sensation that the celebrated Dorus, then a young man, at once laid aside the old flute, and with his wonted energy and talent soon mastered the Böhm flute. In 1837 the Böhm flute was introduced into the Paris Conservatoire, after a committee—of which Savart, Prony, and Dulong were members—had borne the highest testimony to its merits.

In 1846 Böhm crowned his invention by substituting a cylinder for the old conical bore; he also introduced that parabolic curve in the head joint, which is necessary for correctness of intonation in the high notes. This flute obtained the Gold Medal at the Universal Exhibition (London, 1851), Berlioz taking an active part in the decisions of the jurors. Also at the Paris Exhibition, 1855, it carried off the Gold Medal, to which was added a most flattering acknowledgment of the merits of Böhm's system. At the present time the Böhm flute is played upon all over the civilised world.

Those who know how great is the distance which

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not for the shakes, any more than are the rings of the Boehm flute. The learned Professor is doubtless more familiar with the mysteries of Binomial Theorem than with the shakes on the flute.

separates the conception of even the happiest ideas from their realisation and introduction in a practical form, will see a proof of the value of Böhm's system in the fact that it has at length established its position in the musical world, notwithstanding the long-continued opposition of many leading artists. In a letter to Böhm, already quoted, Gordon writes that Drouet and Tulou approved of his flute; but would not hear of a change of fingering.

Böhm's flute would have been rejected for the same reason, had not its superiority been such as to throw into the shade all others—old or new. Thus I have again related in its general outlines the history of the invention and development of the Böhm flute. Probably, I am the best witness as to the whole matter; for I lived over fifty-two years with my friend Böhm; under my guidance he devoted himself most perseveringly to the study of acoustics. I witnessed his innumerable experiments, which embraced all wind instruments; and which could only be carried out by one who united in his own person a practical knowledge of technical mechanism and of acoustic science.

That such a man should have borrowed from others the ideas upon which he founded the construction of his instruments, is what no one can seriously believe.

In later years Böhm extended the compass of the flute, carrying it down from C to the low G, thus adding a new powerful and effective instrument to the resources of musical art. His key mechanism, now used upon all wind instruments of the better class, has already secured for Böhm a permanent place in the history of musical instruments. The keys upon the foot joint of the flute, formerly supported by "cheeks" cut out of the wood and having a brass pin for axle—also the equally clumsy metal cups—were replaced by small pillars and slender steel rods and axles, revolving in the ball-shaped extremity of the pillar, and working with the accuracy and

precision of a chronometer. The delicate steel springs of the mechanism furnished the means of uniting the action of keys placed at opposite extremities of the flute tube, and enabled the performer to cover a distant hole as perfectly, and with the same certainty, as if the key lay beneath the finger. Keys are indispensable for the large holes of the Böhm flute; they cannot be covered by the unaided finger. Upon the old flute the keys opened small holes; upon the Böhm flute the keys hermetically close large holes. Böhm made with his own hands the first batch of his flutes, and he accustomed both his workmen and his successor to such finish of mechanism as has seldom been equalled and never surpassed.

(Signed) CARL VON SCHAFHÄUTL,

Doctor and Professor in the Royal Bavarian Academy, University, and Conservatorium.

MUNICH, *January* 23, 1882.

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